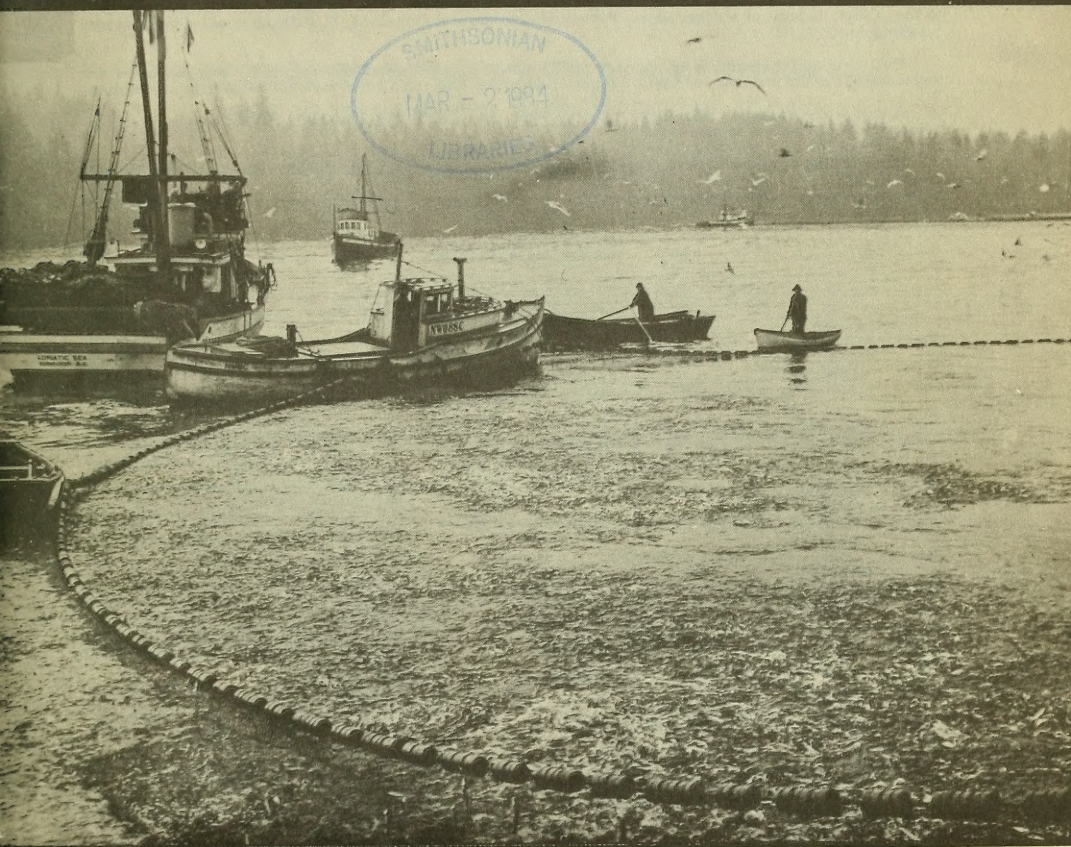




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COMMERCIAL FISHERIES REVIEW



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Joseph Pileggi, Editor
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RESULTS OF EXPLORATORY SHRIMP FISHING OFF WASHINGTON AND OREGON (1958)

By Dayton L. Alverson,* Richard L. McNeely,**
and Harold C. Johnson***

SUMMARY

The ocean pink shrimp fishery off Grays Harbor, Wash., which began in 1956, expanded rapidly following the introduction of mechanical shrimp peelers. Landings in Washington increased from 40,000 pounds in 1956 to an estimated 6.5 million pounds in 1958. To further help the growth of that fishery, four exploratory cruises were conducted off the coasts of Washington and Oregon during 1958 with the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb.

Explorations extended from Cape Beale, Vancouver Island, B.C., to Newport, Oreg. During the four cruises a total of 233 otter-trawl drags was made at depths ranging from 49 to 275 fathoms. Off the Washington coast, good catches were made between Destruction Island and LaPush; and moderate catches were made northwest of Cape Flattery. Off Oregon, commercial concentrations of ocean pink shrimp (Pandalus jordani) were located west of Tillamook Head, Manhattan Beach, and Cape Lookout. Trawling off Tillamook Head yielded catches at rates up to 2,800 pounds heads-on shrimp an hour.

Drags between 61 and 90 fathoms resulted in the highest catch rates, although fishing was also productive between 91 and 120 fathoms. Green mud or green mud and sand bottom characterized areas in which good shrimp catches were made. Bottom temperatures ranged between 42.1 and 44 degrees F. in the areas fished.

Fish taken during shrimp trawling included predominantly smelt, small "soles" and eelpouts. On one occasion 4,000 pounds of shrimp were taken in a half-hour drag.

A fishery for ocean pink shrimp (Pandalus jordani) began off Grays Harbor, Washington, in 1956. Expansion of the fishery followed the introduction and successful use of mechanical peeling machines in the fall of the same year. The machines lowered the cost of processing and increased the capacity of processing plants. Subsequently, the demand for shrimp increased, and catches of ocean pink shrimp in Washington increased from 40,000 pounds in 1956 to 2.3 million pounds in 1957 (Robinson et al 1958). Preliminary data indicate that the ocean pink shrimp catch for 1958 exceeded 6.5 million pounds.

An excellent demand for the "cocktail-size" shrimp resulted in an increase in the number of vessels participating in the fishery: from 5 trawlers in 1957 to about

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25 trawlers in 1958. It was soon evident that the relatively small area being trawled would not fulfill the needs of the expanding industry. For this reason, four exploratory cruises were conducted during 1958 aboard the U. S. Bureau of Commercial



Fig. 1 - The U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb.

Fisheries vessel John N. Cobb (fig. 1) outside the area of the known commercial fishing grounds. The cruises, carried out in cooperation with the fisheries agencies of the States of Washington and Oregon, were designed to acquire information concerning sizes, quantities, and availability of shrimp inhabiting offshore waters from northern Washington to central Oregon. The 1958 exploratory shrimp work began in March and terminated in November.

BACKGROUND

The earliest shrimp fishing on the Pacific Coast of the United States reportedly began in San Francisco Bay during 1869 (Bonnot 1932). Italian fishermen with small beach seines fished the shallow waters of the southern bay for two species of small brown shrimps (*Crangon*

franciscorum and *Crangon nigricauda*). Several years after the inception of that fishery, Chinese-American fishermen introduced a set net which proved superior to seines and became the major method of capture. The brown shrimp fishery has persisted since its inception, and production varied between 0.25 and 1.7 million pounds annually (California Division of Fish and Game 1949). Until recent years, California shrimp fishing remained an "inside" fishery and failed to expand to coastal regions, except for a small pot fishery for spot shrimp (*Pandalus platyceros*) that was attempted by Monterey fishermen during the early 1930's. Difficulties in fishing deeper than 100 fathoms, the depth at which the shrimp were found, and heavy trap losses due to a severe storm proved costly, and that fishery was eventually discontinued.

A fishery for the two species of pink shrimp (*Pandalus jordani* and *Pandalus borealis*) began in Puget Sound in about 1888 (Smith 1937), and as in the early California fishery, beach seines were used to make the catches. Beam trawls pulled by steam tugs soon replaced seines, and after the turn of the century the fishery expanded rapidly. Smith (1937) reports that over 429,000 pounds of *Pandalid* shrimp were landed from Puget Sound in 1903, and catches remained good between 1903 and 1915. Between 1915 and 1922, the catch fell off and remained at a low level until the development of an offshore shrimp fishery in 1956.

PREVIOUS EXPLORATORY FISHING: Shrimp explorations conducted by State and Federal research agencies have played an important role in initiating the offshore shrimp fisheries of the Pacific Coast. Between 1950 and 1953, the California Department of Fish and Game carried out offshore shrimp explorations between Los Angeles and Crescent City, Calif. (Squire 1956). Those explorations located commercial concentrations of ocean pink shrimp in six areas. Best catches were made off the northern part of the State between Bodega Bay and Crescent City.

The Oregon Fish Commission initiated shrimp explorations in the fall of 1951. A total of 80 drags was made between the Columbia and Rogue Rivers (Pruter and Harry 1952) and catches of ocean pink shrimp were reported from "practically all areas explored where the bottom consisted of green mud and where the depths ranged between 60 and 80 fathoms." That report suggested that shrimp were present in sufficient quantities to support a commercial fishery.

Explorations off the west coast of Vancouver Island were begun in 1955 by the Fisheries Research Board of Canada. Using a small otter trawl, 150 experimental drags were made at depths between 48 and 112 fathoms. Best results were reported off the mouth of Nootka Sound, west of Esteban Point, Vancouver Island. The investigators concluded, however, that "shrimp were not present in sufficient quantities to support a fishery" (Butler and Dubokovic 1955b). Investigations conducted by the Canadians along the east coast of Vancouver Island resulted in reports of commercial concentrations of shrimp in the bays and the inlets of this area (Butler and Legare 1954, Butler and Dubokovic 1955a).

During the fall of 1955 and the spring of 1956, the U. S. Fish and Wildlife Service, in cooperation with the State of Washington Department of Fisheries, conducted explorations to determine the species and availability of shrimp off the Washington coast (Schaefers and Johnson 1956). Exploratory fishing was carried out between Cape Alava and Willapa Bay. Excellent catches were made off Grays Harbor at depths between 60 and 85 fathoms. A further contribution resulting from those explorations was the introduction of the Gulf shrimp trawl as an efficient gear for capturing ocean shrimp on the Pacific coast (Stern 1957).

The exploratory work conducted by those fisheries agencies led to the development of the commercial shrimp fisheries, and ocean pink shrimp are now harvested off the coasts of California, Oregon, Washington, and British Columbia.

FISHING METHODS AND GEAR

A Gulf of Mexico-type flat trawl, 43 feet along the footrope^{1/} and of 1½-inch mesh was the principal gear used in the explorations (fig. 2). The trawl, similar to that described by Schaefers and Johnson (1957), was towed from a single warp using a 25-fathom bridle. Doors used with this net measured 2½ by 5 feet and weighed 160 pounds each. No "dandyline" gear was used as the net was attached directly to the back of the doors by 2-foot extension straps (fig. 3). The gear was set and hauled directly over the stern of the vessel. The cod end was hauled to the stern with a lazyline as the net was retrieved, and the catch was hoisted aboard.

A 72-foot Gulf of Mexico-type semiballoon trawl was occasionally used. That net has been described by Greenwood (1959). The net was rigged in a manner similar to standard West Coast otter trawls, with single warps to each door, but only 12-foot extensions were used between the net and the doors. Trawl doors used with the net measured 3½ by 8 feet and weighed 385 pounds each.

^{1/} All net sizes given in this report represent footrope lengths.

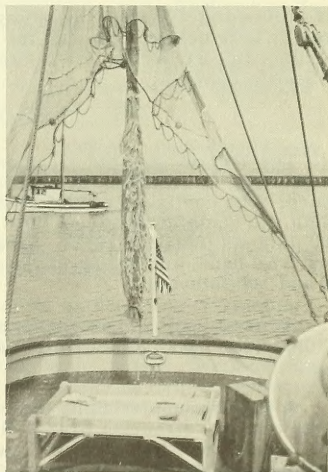


Fig. 2 - A 43-foot Gulf of Mexico-type shrimp trawl drying in the rigging of the M/V John N. Cobb. The sorting table is shown below the net.

Three fathoms of towing warp were used for each fathom of depth (a "scope" ratio of 3 to 1). Towing speed averaged about 2.8 knots, and drags were normally 30 minutes long.

Catches were spilled onto a sorting table on the stern of the vessel and fish, miscellaneous invertebrates, and trash were removed. The shrimp were then washed and weighed.

Random samples of shrimp were taken from the catches for study by biologists of the Washington Department of Fisheries or the Oregon Fish Commission or were collected for them by vessel personnel.

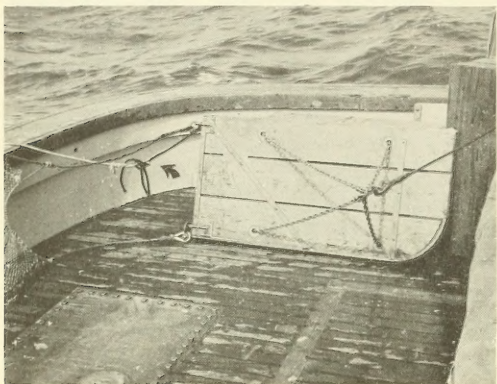


Fig. 3 - Port-side otter board showing method of net attachment. Note layline attached to upper door shackle.

ture immediately above the bottom was obtained at the end of each drag. Oceanographic data collected during the cruises are available from the U. S. Bureau of Commercial Fisheries North Pacific Exploration and Gear Research field station at Seattle 2, Wash.

In planning and conducting the explorations, consideration was given to bottom characteristics shown on the U. S. Coast and Geodetic Survey charts. Studies of previous investigations showed that trawling in areas between 40 and 90 fathoms on green mud or mixed green mud and sand bottom yielded best catches of ocean pink shrimp. Such areas were, therefore, intensively investigated. Exploratory drags were also made in waters deeper than 90 fathoms in attempts to determine the availability of other species of shrimp.

Information on the bottom type and bottom water tempera-

AREAS OF EXPLORATION

The cruises covered a region that extended approximately 250 miles north and south along the Washington and the Oregon coasts and to a maximum of 38 miles offshore. The continental shelf in the region explored, averages about 20 miles in width and contains large portions exceeding 50 fathoms with terminations close to 100 fathoms (Shepard 1948). Sandy bottom predominates near shore, while mud, mud and sand, and occasionally gravel characterize the bottom at depths between 50 and 100 fathoms.

A broad bank, extending approximately 50 miles seaward, lies south and west of the Swiftsure Lightship at depths of 60 to 80 fathoms. Large boulders limit trawling in the area.

A deep trough breaking the continental shelf extends from Cape Flattery in a southwesterly direction (figs. 5, 6, and 7). Sections of the trough range from 150 to 200 fathoms in depth. From Cape Flattery south to the Umatilla Lightship, the continental shelf is about 10 miles in width, and from a depth of about 50 fathoms it slopes steeply into the trough.

From the Umatilla light to Destruction Island, the shelf broadens and the slope between 50 and 100 fathoms is gradual with more area available for trawling. The shelf narrows briefly near Point Grenville and then broadens again and is about 30 miles in width as far south as Willapa Bay. Between Cape Flattery and Columbia River, the offshore slope (deeper than 100 fathoms) is relatively steep and irregular.

Off the mouth of the Columbia River, the continental shelf is broken by a prominent submarine canyon that extends inshore to about 60 fathoms. The side slopes of the canyon are steep but can be trawled in many areas. Between the Columbia River and Cape Falcon the shelf broadens to about 30 miles, narrowing again south of the Cape. From Cape Falcon to Cape Foulweather, Oreg., the slope of the continental shelf becomes more gradual and a considerable area suitable for trawling exists between the 100- and the 300-fathom contours.

FISHING RESULTS

Ocean pink shrimp were the only species found in commercial quantities during the four cruises. Larger pandalid shrimps--sidestripe (*Pandalopsis dispar*), spot shrimp (*Pandalus platyceros*), and coonstripes (*Pandalus hypsinotus*)--were few in number. The brown shrimp (*Crangon* sp.) was present in many catches but never in commercial quantities.

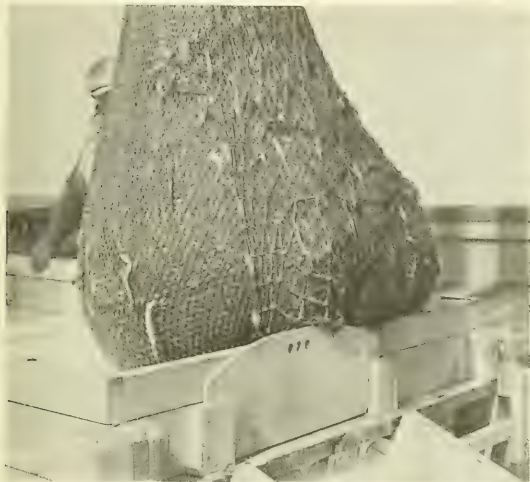


Fig. 4 - A large catch about to be spilled onto the sorting table on the deck of the John N. Cobb.

Ocean pink shrimp were caught in commercial quantities off the coasts of Northern Washington and Central and Northern Oregon. Best catches off the Oregon coast were made west of Tillamook Head. Fishing in that area yielded catches at rates up to 2,800 pounds heads-on shrimp an hour. Catches of commercial significance were also made west of Cape Lookout and Manhattan Beach. (Fig. 4.)

Off the Washington coast, good catches of ocean pink shrimp were caught between Destruction Island and LaPush. Somewhat smaller catches were taken northwest of Cape Flattery.

During the four exploratory cruises, 233 drags were made at depths ranging from 49 to 275 fathoms. For convenience, the region explored has been divided into three areas: Cape Beale, Vancouver Island, to Point Grenville, Wash.; Point Grenville to Cape Falcon, Oreg.; and Cape Falcon to Newport, Oreg. The position and number of each tow is shown in figures 5, 6, and 7. Drags have been arbitrarily numbered from north to south. The following discussion is generally confined to drags which yielded promising results.

CAPE BEALE TO POINT GRENVILLE (fig. 5): A total of 69 exploratory drags was made between Cape Beale, Vancouver Island, and Point Grenville, Wash. The bottom in that area is generally free of snags, and in most areas sampled, consists of green mud or green mud and sand.



Fig. 5 - Exploratory shrimp drags made by the John N. Cobb between Cape Beale, Vancouver Island, and Point Grenville, Wash.--1958.

Best catches were made between LaPush and Point Grenville, Wash.^{2/} Of 29 drags made in that area during May 11 drags caught heads-on pink shrimp at rates ranging from 400 to 1,500 pounds an hour--averaging about 200 to the pound.^{3/} The shrimp in the area were most concentrated between 61 and 70 fathoms, and drags made in shallower or deeper water were not commercially productive.

Moderate catches of ocean pink shrimp were made during May about 20 to 30 miles off Cape Flattery. Six drags (numbers 8, 11, 12, 16, 17, and 23) made in that area, at depths ranging from 68 to 107 fathoms, resulted in heads-on shrimp at catch rates of 233 to 650 pounds an hour. Average shrimp counts ranged from 102 to 135 heads-on shrimp per pound. Other drags made in the same general area and depth range were less productive. The area west of Cape Flattery appeared to offer a potential for commercial use, although catches contained considerable amounts of fish.

One drag (number 2) made west of Cape Beale in 64 to 66 fathoms resulted in a catch of 200 pounds of ocean pink shrimp that averaged 107 count, but other drags in the area did not produce commercial quantities of shrimp. Thirty pounds of side-stripe shrimp (56 shrimp to the pound) were taken west of Cape Beale (drag 3), and represented the largest catch of that species made during the explorations.

A number of drags were made in the deep-water trough running southwest from Cape Flattery and on the offshore continental slope. No commercial concentrations of shrimp were found in those deep-water tows.

POINT GRENVILLE TO CAPE FALCON (fig. 6): A total of 81 exploratory drags was made between Point Grenville, Wash., and Cape Falcon, Ore. Fishing activities were concentrated in the area between Columbia River and Cape Falcon, because most of the northern part of the area was investigated during 1956 (Schaefer and Johnson 1957). No snags were encountered during exploratory trawling at depths shallower than 100 fathoms, although the net was fouled several times when trawling in deeper water.

Best shrimp catches during the explorations were made between the Columbia River and Cape Falcon, Ore., where a total of 74 exploratory drags was made. The largest catch (drag 121) in the area resulted in an hourly rate of 2,804 pounds of heads-on shrimp that averaged 100 count. A 72-foot semiballoon trawl was used for that drag which was made west of Tillamook Head in 82 to 83 fathoms. Seventeen other drags made during March and April at depths from 70 to 91 fathoms, between Columbia River and Cape Falcon, yielded heads-on shrimp at rates from 600 to 1,350 pounds an hour. Those shrimp ranged in size from 88 to 126 a pound. Six of the latter drags (numbers 99, 103, 119, 123, 126, and 149) were made with the 72-foot semiballoon trawl. The majority of the larger catches in the area were obtained in a relatively narrow depth range, i.e., between 82 and 86 fathoms.

Catches between Point Grenville and the Columbia River were generally poor, and deep-water tows through that area and south to Cape Falcon yielded only trace amounts of shrimp.

CAPE FALCON TO NEWPORT (fig. 7): A total of 83 exploratory drags was made between Cape Falcon and Newport, Ore. The bottom was clear in areas fished, and only 2 snags were encountered.

Good catches of pink shrimp were made in the general area off Cape Lookout during June at depths between 90 and 114 fathoms. Seven drags (numbers 170, 171, 173, 174, 177, 185, and 186) in that area produced heads-on shrimp ranging from 81 to 138 per pound, at rates from 380 to 850 pounds an hour. Four other drags in the same area and depth range were less productive.

^{2/}Subsequent to exploratory work conducted in 1958 the commercial fishery expanded to include this area, as well as the grounds off northern Oregon.

^{3/}Counts given in this report are the number of whole shrimp (heads-on) per pound.

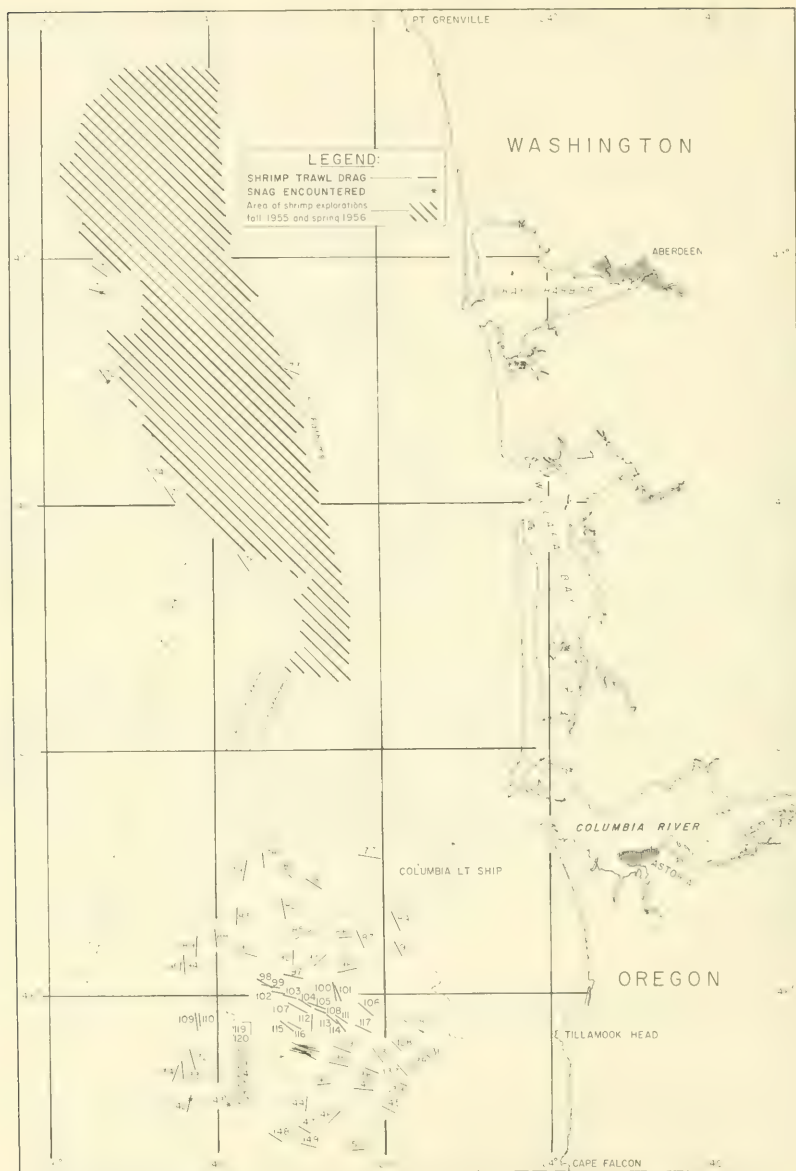


Fig. 6 - Exploratory shrimp drags made by the John N. Cobb between Point Grenville, Wash., and Cape Falcon, Oreg.--1958.

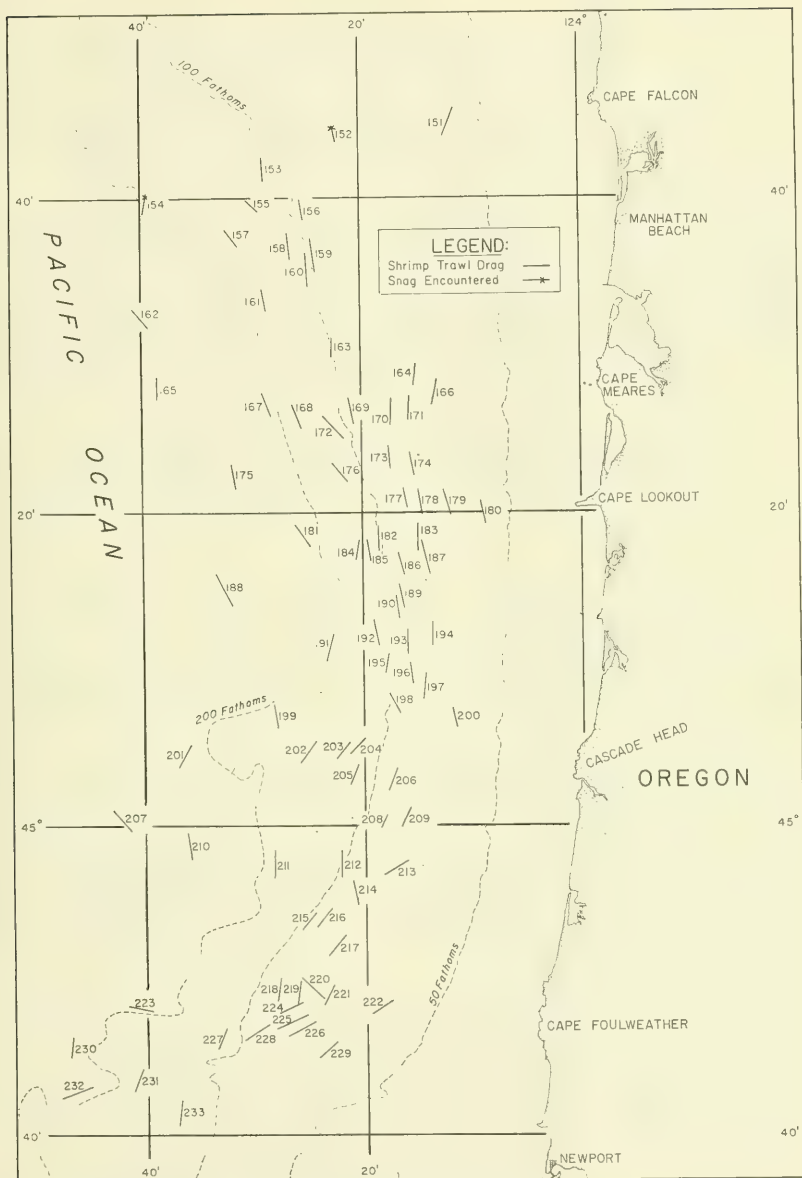


Fig. 7 - Exploratory shrimp cruise made by the John N. Cobb between Cape Falcon and Newport, Oreg.--1958.

West of Manhattan Beach, the three best drags (numbers 153, 158, and 159), at depths from 96 to 105 fathoms, resulted in ocean pink shrimp catches at rates from 440 to 600 pounds heads-on per hour. The count ranged from 109 to 175 shrimp per pound heads on.

Four drags (numbers 215, 224, 225, and 226) west of Cape Foulweather in 76 to 99 fathoms also yielded a fair sign of pink shrimp. Catch rates for those drags ranged from 200 to 450 pounds heads-on per hour with sample counts ranging from 129 to 170 shrimp per pound.

CATCHES AS RELATED TO DEPTH, BOTTOM TYPE, AND TEMPERATURE

Results of previous exploratory cruises (Schaefers and Johnson 1957, Pruter and Harry 1952, Squire 1956) off the west coast of North America show that concentrations of ocean pink shrimp most frequently occur at depths ranging from 40 to 90 fathoms. The larger catches of shrimp during the 1958 explorations were caught within that range, but several drags at depths down to 115 fathoms also yielded good catches, and shrimp were not found in abundance at depths of less than 60 fathoms (table 1). Highest catch rates were obtained at depths between 61 and 90 fathoms, and moderate yields were obtained at depths between 91 and 120 fathoms.

Table 1 - Rates at Which Shrimp Were Caught at Various Depth Intervals Off the Washington and Oregon Coasts During 1958 Explorations^{1/}

Depth Fathoms	Drags Made No.	Total Hours Fished	Total Catch (heads on) (Pounds)	Catch rate/hour
51-60	8	4.0	185	46
61-70	35	17.5	6,049	346
71-80	30	15.0	3,859	257
81-90	57	28.5	10,327	362
91-100	23	11.75	2,239	191
101-110	17	8.5	903	106
111-120	5	2.5	419	168
121-130	6	3.0	25	8
131-140	3	1.5	62	41
141-150	6	3.0	7	2
151-275	30	15.0	1	0

^{1/} Does not include 13 drags during which gear failure or damage was noted.

Data in table 1 summarize information from various times of the year and over a considerable geographic range. Ocean pink shrimp may be concentrated within a narrow depth range on one bank, while on nearby grounds they may be found at different depths and over a greater depth range: best catches between Destruction Island and LaPush were made at depths between 61 and 70 fathoms, and good catches to the north and west of Swiftsure Lightship were taken at depths ranging from 68 to 107 fathoms.

Vertical movements of shrimp probably occur seasonally, resulting in changes in their availability to the fishing fleet. Such movements, however, are not demonstrated by the data from these explorations. Evidence of vertical movements of pink shrimp in response to diurnal changes has been noted during comparative night and day drags that resulted in "excellent catches during the day and poor catches at night" (Schaefers and Johnson 1957). That pink shrimp move off the bottom at night was also demonstrated by nighttime midwater trawl catches off Vancouver Island by the John N. Cobb (Fish and Wildlife Service, U. S., 1956).

Green or gray mud bottom was associated in past studies with areas inhabited by pink shrimp, and in all drags where 50 pounds or more of shrimp were caught

during the 1958 cruises, the bottom consisted of green mud or green mud mixed with sand or clay.

Bottom temperatures varied between 42.1 and 46.7 degrees F. No apparent relation was noted between catches of pink shrimp and differences in bottom water temperature within that range.

INCIDENTAL CATCHES OF FISH

Catches of fish ranged from a few pounds to 4,000 pounds.^{4/} Smelt (*Osmeridae*), eelpouts (*Zoarcidae*), small rex sole (*Glyptocephalus zachirus*), and slender sole (*Lyopsetta exilis*) dominated incidental catches of fish in numbers and were taken in most drags. Catches of marketable food fish were usually small, although some drags west of Swifsure Lightship yielded several hundred pounds of mixed Dover sole (*Microstomus pacificus*), Pacific ocean perch (*Sebastes alutus*), and sablefish (*Anoplopoma fimbria*). Other species common in the catches included turbot (*Atheresthes stomias*), dogfish (*Squalus acanthias*), ratfish (*Hydrolagus coliei*), hake (*Merluccius productus*), and skates (*Raja* sp.).

APPENDIX

A detailed fishing log, showing geographic position, depth, date, catch, and related data for each drag, is available as an appendix to the reprint of this article. Write for Separate 574, which shows Table 2--Fishing Log--Shrimp Trawl Drags Made off the Washington and Oregon Coasts--M/V John N. Cobb, 1958.

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^{4/}A catch of 4,000 pounds of dogfish was taken during drag 10. Other drags took lesser amounts of incidental fish.

FISH FLOUR FOR HUMAN CONSUMPTION

By June H. Olden*

ABSTRACT

A review of the scientific literature on fish flour; references to the original literature are appended.

INTRODUCTION

Economically underdeveloped countries have long needed an inexpensive source of animal protein for human consumption as a help in preventing malnutrition. The use of fish offers a possible way of alleviating this deficiency. A difficulty arises, however, in that in many of the countries where inexpensive protein is needed most, the means of preservation are least available. One approach to the solution of this problem is to dehydrate the fish in order to prevent spoilage. In the category of dehydrated fish is edible fish meal, or fish flour^{1/}. Research programs therefore have been undertaken in several countries to produce a tasteless, odorless, white fish flour for use as a source of the required protein.

In this report, the following topics are discussed: problems encountered in the use of fish flour, nutritional importance, acceptance tests, and processes of manufacture.

PROBLEMS ENCOUNTERED

Some of the problems in using fish flour as a protein supplement are preservation, consumer reaction, and cost. The first two problems directly contribute to cost, since the process that makes the flour resistant to deterioration and renders it tasteless and odorless--and thus acceptable to the consumer--increases the cost.

PRESERVATION: The keeping quality of fish flour depends primarily on the low oil content of the final product to prevent it from becoming rancid. The producer, in order to supply the needs of people in various countries, must furnish a flour that can resist deterioration when stored at high temperatures and under adverse conditions. One of his essential problems, then, is to make a product that is low in oil.

CONSUMER REACTION: In countries where people object to a strong fish flavor, the flour must be refined, deodorized, or manufactured in such manner that the final product is substantially flavorless (Food and Agriculture Organization of the United Nations 1954).

The product should be of such quality that it can be incorporated in quick breads, cakes, cookies, cereals, pastries, and baby foods without lowering the appeal of these foods to the consumer.

COST: One of the difficult problems to overcome is that of cost. A factor in cost that must be kept in mind is the loss in weight of the product due to removal of moisture and oil from the raw material. Owing to this removal, less than one-fifth as much fish flour as the weight of the raw material is produced. This means in general that the cost of fish flour is more than five times the cost of the raw material, since processing costs must be included as well.

The high cost of producing fish flour for human food, in contrast to the relatively low cost of producing fish meal for animal feed, results from the palatability, sanitation, and aesthetic requirements of the consumer. Where fish flour must

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^{1/} Authors often use the terms fish meal and fish flour synonymously.

meet the strictest aesthetic requirements, costs will necessarily be high, since only the more costly portions of the fish can be used.

Van Veen (1959)^{2/} reports: "A good defatted and deodorized fish flour, on a protein basis, should not cost to the consumer in underdeveloped countries much more than he would pay for dry skim milk in the same area. As for the U. S. A. we have been assured by an American firm that a partially deodorized fish flour costs about 36 to 38 cents a kilogram^{3/}. We think that a price of 24 to 40 cents per kilogram is realistic."

NUTRITIONAL IMPORTANCE

In any process of manufacture, the nutritional value of a food product may be reduced. Thus, there may be loss of vitamins and minerals, and the protein may be made less digestible.

Irving, Smuts, and Sohn (1952) compared white fish flour (86.2 percent protein) with bread as to true digestibility and obtained the following data: white fish protein 95.6, bread 93.8, and white fish protein and bread 92.1.

Analyses of bread made from enriched and unenriched brown flour and a comparison with daily requirement are shown in table 1 (Fishing Industry Research Institute 1958).

Biological value of pilchard fish flour and pilchard meal is shown in table 2 (Willmer 1955).

Material and Requirement	Protein G./100 g.	Calcium	Phosphorus	Thiamine (Mg./100 g.)	Niacin	Riboflavin
Brown bread	9.0	50	160	0.3	2.0	0.13
Fish flour	80	7,000	4,500	0.13	5	0.22
2%-enriched brown bread	10.4	186	245	0.296	2.06	0.132
Daily requirement	70	800	900	1.5	15	1.8

Note: From Memorandum No. 89, Fishing Industry Research Institute, Cape Town, South Africa, 1958.

In order that a standardized stable fish meal may be produced that is equal in chemical and biological value to the fish from which it is derived, Levin (1959) suggests: (1) the product must be made from the whole fish with no division of products into fish meal and fish solubles, (2) the fish must be defatted and dried at temperatures that

Material	Net Protein Utilization	True Digestibility	Biological Value
Pilchard meal, factory produced.	61.6	86.8	71.0
Pilchard fish flour, prepared in laboratory.	62.6	82.6	75.8

Note: From Eighth Annual Report of the Fishing Industry Research Institute, Cape Town, South Africa, 1955.

will not damage the product, and (3) the fish meal must be standardized on the basis of biological value. Both an animal as-

say that is accepted by nutritionists as a measurement of protein quality and a biological measurement of the identified growth factors should be obtained.

The bulk or fiber content of the diet often may be a determining factor in the digestibility of protein incorporated in that diet (Nutrition Reviews 1955).

Sure (1957a) reports that fish flour was used in rat-feeding studies to determine the influence of this product on growth and protein efficiency. Small amounts of defatted fish flour were added to milled wheat flour, white corn meal, and polished rice. Gains in body weight and protein efficiency obtained were superior to those obtained in the past with dried nonfat milk solids, dried buttermilk, defatted soybean flour, brewers' yeast, cultured food yeasts, and peanut meal.

He also reports (1957b) that rats used in feeding tests in which small amounts of defatted fish flour were added to whole yellow corn, whole wheat, whole and ^{2/} Personal communication from A. G. van Veen, Chief, Food Processing and Preparation Branch, Nutrition Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, June 18, 1959, ^{3/} 2.2 pounds = 1 kilogram.

milled rye, grain sorghum, and millet showed definite increases in body weight. The greatest responses were secured with grain sorghum, millet, and whole yellow corn.

ACCEPTANCE TESTS

Experiments on consumer acceptance of fish flour have been conducted in a number of countries, including Chili, Thailand, and Mexico.

CHILI: Each day for 6 weeks, 140 school children in Chili received, as part of their school lunch, a 90-gram bread roll made from wheat flour containing 10-percent fish flour. Taste, smell, form, and consistency of the bread were normal, and the bread was only slightly darker than is that made from ordinary flour. There were no rejections or complaints by the children, and no digestion trouble occurred (Food and Agriculture Organization of the United Nations 1954).

THAILAND: An experiment, the results of which have not been published as yet, was carried out in the village of Nongkorn, Ubol Province, Thailand, to test the acceptability of fish flour by the people of the village. About 600 persons were given a daily ration of 15 grams of fish flour to supplement their scant intake of protein. This flour was made from "platu" and "slipmouth" fish. About 5 tons of flour can be produced from about 28 tons of fish per day. Smaller fish, which previously had little or no market, can be used for the fish flour.

If this experiment proves successful, the flour will be made available to all villages of the province (FAO Bulletin No. 2).

MEXICO: Levin (1959), citing the work of Frederico Gomez ("Studies on the Use of Deodorized Fish Flour in Malnutrition," Boletin Medico del Hospital Infantil, September 1958), reports that at a hospital in Mexico, the value of fish flour has been studied for two years, using methods of measurement such as nitrogen balance studies on children--comparing a corn-bean diet plus 10-percent fish flour with the same diet plus the nitrogen equivalent in the nonessential amino acid glycine. The results indicate that fish flour is of value as a dietary supplement.

PROCESSING

Over the years, many methods for making fish flour have been tried. These methods are basically quite similar to those for preparing fish meal (in fact, as was indicated earlier, some authors use the terms fish meal and fish flour synonymously), but greater attention is given to the sanitary and aesthetic aspects.

As also was indicated earlier, one of the major problems that must be resolved is the oxidation of oil in the fish flour. Since the ordinary methods of producing fish meal leave considerable oil in the material, the product generally is not suitable for human use unless the starting material is very low in oil content.

For this reason, attention now has turned largely to a process of manufacture based primarily on solvent extraction. This process, of which there are a number of variations, is effective in removing oil.

TENTATIVE SPECIFICATIONS FOR SOLVENT-EXTRACTED FISH FLOUR: Food and Agriculture Organization and UNICEF, agencies of the United Nations, developed the following "Tentative Specifications for Solvent Extracted Fish Flour Defatted and Deodorized." These Specifications, dated June 12, 1957, remain in effect, although they are still tentative:

"1. Starting material shall be edible fish of a known species and in a condition fit for human consumption at the start of the process. The material to be processed

shall be whole fish or whole degutted fish, or degutted fish with heads and tails removed.

"2. Handling of the fish from catch to end of processing shall be done with sanitary precautions ordinarily applied in producing human food. The fish may be dried either during the process of solvent extraction or by a preliminary stage of air drying. In either case, temperatures shall be kept sufficiently low to avoid protein damage. In general, temperatures in excess of 212° F. will result in definite damage. Lower temperatures may cause some damage under certain circumstances.

"3. Finished flour shall meet the following specifications:

"Protein (Nx6.25): content 70 percent minimum, digestibility 90 percent minimum, biological value 70 percent minimum.

"Amino Acids: Minimums of lysine 9.5 percent, tryptophan 0.9 percent, methionine 3.0 percent, cystine 1.0 percent (all as percent of protein).

"Moisture: maximum of 8 percent.

"Fat: maximum of 0.4 percent.

"Ash: maximum of 18 percent.

"Particle size: 100 percent of the flour shall pass a 100-mesh screen.

"Color: not darker than a light gray or tan; ordinary bread baked with 1 part fish flour and 11 parts of ordinary white wheat flour will not show appreciable darkening.

"Odor and Taste: the flour shall have no more than a faint fish odor and taste; and when baked in bread as described above shall have no detectable fish taste or odor.

"Storage stability: after 6 months storage at temperatures prevailing in the area of intended use but not exceeding 100° F., and when packed in closed fiber or metal containers or in polyethylene bags, the flour shall show no spoilage as judged by rancidity, mold growth, deterioration in biological value or 'flavor reversion' as judged by the criteria listed under odor and taste.

"Bacteriology: the flour shall be free of B. coli, Salmonella, and pathogenic anaerobes. The total bacterial plate count shall be not more than 2,000 per gram.

"Safety: no additives, preservatives, or solvent residues are permitted. Safety tests in at least one species of animal shall be done according to requirements of the appropriate official agency of the country where the flour is to be used. (Note: FAO and WHO advisory groups have recommended 6-months studies in rats using diets in which the fish flour is the sole source of protein, and the test should include one reproductive cycle. If there is any reason to suspect safety hazards, more elaborate tests and additional species of animals may be required. These recommendations pertain principally to products intended as supplementary foods for infants and children.)

"4. Chemical methods shall be those of the American Official Agricultural Chemists or equivalent 'official' generally-accepted methods. Amino acids may be determined microbiologically using generally accepted methods such as those described in Barton-Wright, E. C. "The Microbiological Assay of the Vitamin B Complex and Amino Acids," Pitman Publishing Corp., New York (1952), or chromatographically by the Moore and Stein procedure. Bacteriological methods shall be

official methods of the American Bacteriological Association, the American Public Health Association, or equivalent accepted methods. Biological value may be determined by the Miller-Bender or the Mitchell methods."

PRODUCTION: Some of the countries producing fish flour are South Africa, Canada, Great Britain, France, and the United States. Closely allied products are manufactured in India, Germany, and Russia. The process varies somewhat from country to country. References listed in the appended bibliography should be consulted for details on actual manufacture.

SOUTH AFRICA: Scientists in South Africa have reported that they have developed a process for making tasteless and odorless fish flour, which now is being used to enrich brown bread (Indo-Pacific Fisheries Council, FAO 1957). The flour has a moisture content that varies between 2 and 3 percent. It is light brown in color and contains no additives. The Fishing Industry Research Institute (1958) reports that the product is stable because of its low content of oil.

This fish flour has been incorporated to the extent of 5 percent in bread, biscuits, and rusks made of wheat flour (Fishing Industry Research Institute, S. Africa 1958). When the present plan is in full operation, about 5,000 tons of fish flour will be used each year (Indo-Pacific Fisheries Council, FAO 1957).

CANADA: Guttman and Vandenheuvel (1947) report that the fish flour manufactured at the Halifax Technological Station is almost white, odorless, and tasteless and contains 2 to 3 percent moisture, 2 to 5 percent ash (mostly calcium phosphate), negligible amounts of lipids, and 94 to 98 percent protein on a dry, ash-free basis.

GREAT BRITAIN: British Patent 727,072 provides a method of powdering fish that is reported in Food Manufacture (1955) to be economical and to result in a product that is tasteless and odorless.

FRANCE: In France, the preparation of fish meal for human food consists primarily in eliminating oil from the fresh fish. It is reported in Food Manufacture (1956) that the fish flour produced by this method is tasteless and odorless.

UNITED STATES: A plant in New Bedford, Mass., which uses an azeotropic solvent method, is apparently the only company in the United States producing fish flour at the present time. Whole fish--any species of any oil content--are processed into a fish flour reported to contain 70 to 80 percent protein and less than 1 percent oil. This company reports that their product can be processed to reduce its odor and flavor or to retain its odor and flavor, depending on the taste of the consumer, and it has good keeping qualities. The determining factors in producing the fish flour at a profit are cost of fish, cost of fuel, and cost of labor (Viobin Corporation 1956).

A fish-processing company with branches in Eastport and Rockland, Me., recently announced plans to produce fish flour on a large scale. A spokesman for the firm reported that the flour will be suitable for use in such foods as bread and crackers (The Fish Boat 1959).

Anyone contemplating the manufacture of fish flour in the United States should first contact the U. S. Food and Drug Administration to make certain that his product can meet food requirements.

The Federal Food, Drug, and Cosmetic Act defines a food as adulterated if it consists in whole or in part of any filthy, putrid, or decomposed substance or if it is otherwise unfit for food. It is the view both of the Food and Drug Administration and of the consumer that the viscera of the larger fish are filthy and otherwise aesthetically objectionable. Similarly, the head, scales, and tail of large fish are

considered unfit for food. The Food and Drug Administration has not objected to the presence of tails and viscera in small herring canned as sardines as long as the feed content of the viscera is eliminated. Another requirement of the Act is that food shall not be prepared, packed, or held under insanitary conditions whereby it may become contaminated with filth or whereby it may be rendered injurious to health.

In view of the above considerations, the use of whole fish or fish containing viscera with feed in the intestines, even though heads and tails are removed, would be objectionable in the manufacture of fish flour or fish meal for human consumption. The Food and Drug Administration would not take exception to the use, for this product, of small herring that were free of feed and subject to all the conditions that control the use of herring in the canning of sardines.

INDIA: Mohanty and Roy (1955) used the meat of sharks and rays to prepare a hydrolyzed fish-protein powder--a cream-colored, flourlike powder containing 85 percent protein. They report that hydrolyzed fish-protein powder is soluble in water, that it keeps well, and that it is useful as a food for hospitalized patients and those suffering from malnutrition or duodenal and ventricular ulcers.

GERMANY: Shenstone (1953) describes a process for making Wiking Eiweiss, a soluble albumen made from fish that can be used as a substitute for egg white. Good-quality fillets of white fish are required for the preparation of this product. He reports that the final product is a slightly gray, odorless and tasteless, easily digestible powder. It may be used in aerated bakery goods, sugar confectionery, ice cream, mayonnaise, custard powder, and pharmaceuticals.

RUSSIA: Schimkat (1955) describes a method of producing dry protein from inexpensive varieties of small fish in the U. S. S. R. He states that the protein is a water-soluble, cream-colored powder with very little fishy flavor and that it contains 70 to 80 percent protein, up to 10 percent minerals, 0.5 percent oil, and up to 10 percent moisture.

SUMMARY

1. Some of the problems encountered in the use of fish flour are preservation, consumer acceptance, and cost.
2. The nutritional aspects of fish flour are currently under study.
3. Fish flour is reported to meet consumer acceptance.
4. The basic process used in the manufacture of fish flour is solvent extraction.
5. A stable, tasteless, odorless, nearly white, edible fish flour is reported to have been produced.

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SANITATION ABOARD FISHING TRAWLERS IMPROVED BY USING CHLORINATED SEA WATER

By Arvey H. Linda* and Joseph W. Slavin*

ABSTRACT

Chlorine, having proved effective as a sanitizing agent in fish-processing plants, was used for improving sanitation aboard fishing vessels. Sodium hypochlorite equipment was installed on a commercial fishing trawler for chlorinating the sea water used aboard this vessel. The equipment operated satisfactorily, and the chlorinated sea water was effective both in washing off slime and blood from eviscerated fish at sea and in washing and cleaning the hold of the vessel in port.

INTRODUCTION

Much has been done in recent years to improve sanitation in fish-processing plants. Today, the use of antibacterial compounds, disinfectants, detergents, and equipment made of stainless steel, plastic, or other impervious materials has resulted for the most part in a high degree of sanitation in fishery plants. Little has been done, however, to duplicate this aboard the fishing vessel. In most cases the closest approach to cleanliness consists of washing the hold and pen boards of the vessel with plain sea water, or in some cases with harbor water, without any antibacterial or other suitable cleaning compounds. The use of sea water for this purpose is far from satisfactory: slime and other organic material are not adequately removed, and by building up in the hold, they stimulate the growth of spoilage organisms. Under such conditions, the landing of high-quality fish is difficult, especially if the vessel is at sea for a long period of time.

In 1958 a project was started at the U. S. Bureau of Commercial Fisheries technological laboratory at East Boston, Mass., to develop a simple, inexpensive, and effective means for improving washing methods on fishing trawlers. Since chlorine has proved effective as a sanitizing agent in fish-processing plants (Fisheries Research Board of Canada 1947, Food Industries 1950, Hess 1950, Hurley 1949, and Kaylor 1949), it was used in this project to improve the sanitation on a commercial fishing trawler. Chlorinated sea water was used on the vessel instead of plain sea water for washing eviscerated groundfish at sea and the hold of the vessel in port after the fish were unloaded. The effectiveness of the chlorinating equipment was evaluated by industry and by members of the laboratory staff. The following is a report of this study. It contains information on the chlorinating equipment used and the experimental tests conducted. Conclusions and recommendations are also given concerning the use of chlorinating equipment on the vessel.

CHLORINATING EQUIPMENT

The equipment used consisted of a motor-driven sodium hypochlorite metering pump, a storage drum, and chlorine-test equipment.

DESCRIPTION OF EQUIPMENT: Metering Pump and Motor: The sodium hypochlorite metering pump and motor were mounted on a common base. This pump is of the diaphragm type and is belt driven by one-eighth horsepower, direct-current, electric motor. The length of the pump stroke may easily be adjusted in order to meter the desired amount of sodium hypochlorite into the line through which the saline wash-water passes. The flow of sea water through the line may vary from 20 to 60 gallons per minute.

Storage drum: A 55-gallon container was used for storing the sodium hypochlorite solution. This particular type of drum was selected because of its rugged construction, which is necessary to withstand the rough handling aboard the vessel.

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Chlorine-Test Equipment: A chlorine colorimeter was used to determine the concentration of free chlorine discharged from the salt-water line. This colorimeter consists essentially of a set of calibrated color standards representative of the different concentrations of free chlorine in the chlorinated sea water. To determine the concentration of free chlorine, one adds a prescribed amount of stabilizer and reagent to a sample of the treated sea water. The resulting color is then matched with the color standards in order to determine the chlorine content of the sample in parts per million. A simpler and less expensive kit consisting of chemically-treated paper strips may also be used to determine the chlorine content.

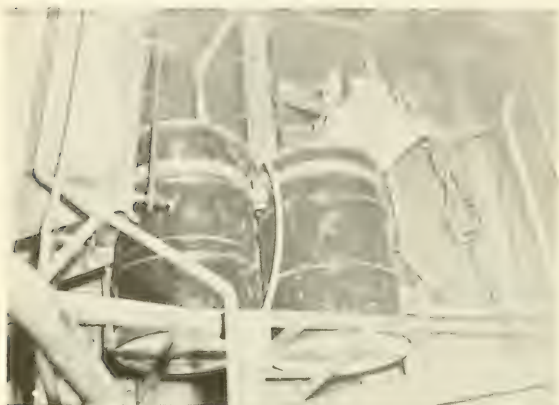


Fig. 1 - Sea water chlorinating equipment aboard a fishing vessel.

situated below the wheelhouse offers an ideal place for locating the chlorinating equipment. To conserve space, the metering pump and motor were mounted on one wall bracket and the two storage tanks on separate wall brackets below this pump (fig. 1). The plastic hypochlorite discharge line from the metering pump was connected into the side of the salt-water line, on the discharge side of the deck wash-water stop valve. In future permanent installations, a check valve should be installed between the wash-water stop valve and the hypochlorite connection on the wash-water line to prevent any of the caustic hypochlorite from attacking the sea-water pump or related piping. The desired equipment arrangement is shown in figure 2.

Installation of Equipment: On most New England trawlers, the compartment

EXPERIMENTAL TESTS

PROCEDURE: The chlorinating equipment described previously was assembled at the laboratory and installed on a commercial fishing trawler (fig. 1). The hypochlorite metering pump was set to inject a 14-percent sodium hypochlorite solution into the wash-water line at a rate that resulted in a concentration of 50 to 60 parts per million (p.p.m.) of free chlorine in the salt water. This water was used for washing both the eviscerated fish at sea and the hold of the vessel at the end of each trip. Chlorinated sea water was used aboard this vessel for six regularly-scheduled trips. During that period information was obtained on the operation of the chlorinating equipment. Observations were also made concerning the sanitary condition of the fish hold and the quality of the fish landed.

RESULTS: Operation of Chlorinating Equipment: During the entire period of the test, the chlorinating equipment operated satisfactorily and required little attention. It was found that during continuous operation of the unit, 30 to 60 gallons of a 14-percent sodium hypochlorite solution was consumed during a 10-day trip. The consumption of sodium hypochlorite was reduced to about one-half this amount, however, by operating the metering pump intermittently instead of continuously. This intermittent operation was accomplished by installing a switch in the wheelhouse, which made it possible to use the unit only during the period that the fish were being washed at sea or that the hold of the vessel was being washed in port.

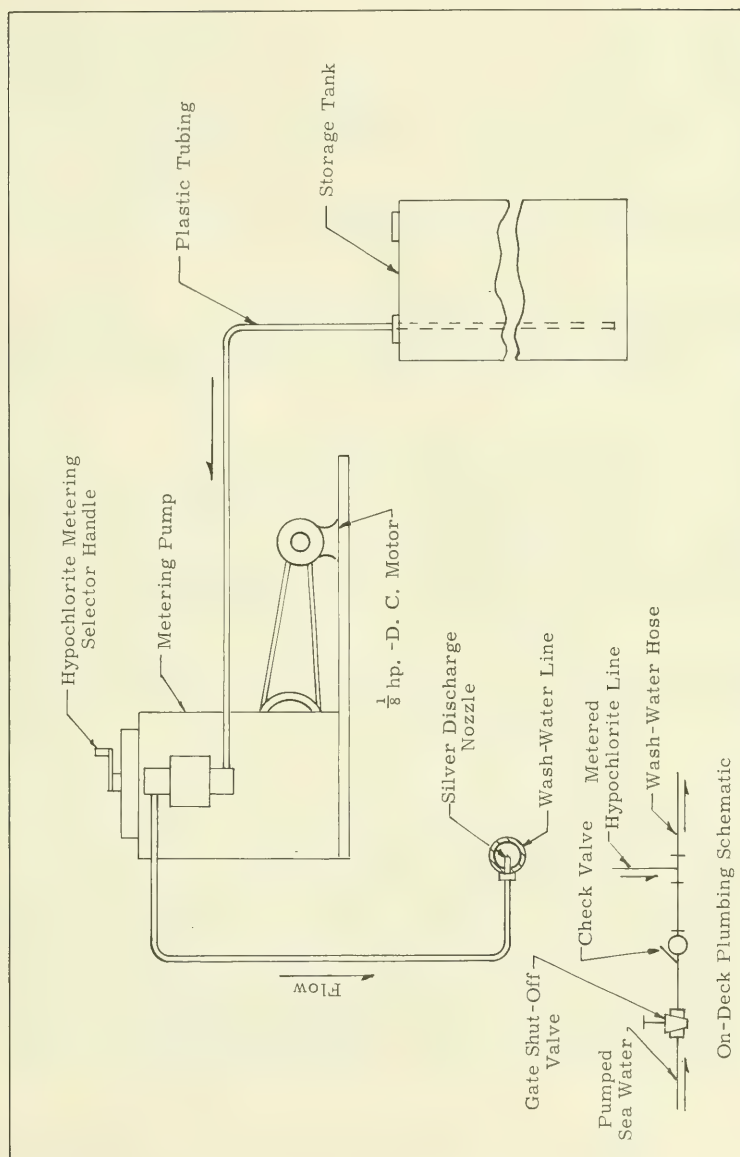


Fig. 2 - General layout of sodium hypochlorite metering installation.

In general, the chlorinating equipment was found to be quite satisfactory for use on a commercial fishing trawler.

Sanitation and Condition of the Fish: The chlorinated sea water was effective in washing the fish and the hold of the vessel. It was observed in washing the eviscerated fish that the chlorinated sea water rinsed the blood and slime of the fish more effectively than did plain sea water, resulting in the deposit of cleaner fish in the hold of the vessel. Also, the chlorine seemed to minimize the staining of the fillets that ordinarily results from bleeding caused by forking the fish. The concentrations of free chlorine of 50 to 60 p.p.m. used in washing the fish did not affect the odor or color of the fish. This substantiates the results of a previous study where it was found that concentrations of free chlorine up to 150 p.p.m. and 2,000 p.p.m. did not adversely affect the flavor and color of fish, respectively (Castell 1947).

In washing the hold of the vessel, the chlorine dispersed quite rapidly and did not affect personnel working in the fish hold. The chlorinated sea water also satisfactorily removed fish slime and blood from the storage pens and pen boards. The crew of the vessel commented that the pen boards were easier to wash with the chlorinated sea water than with plain sea water. It was also observed that after washing, the hold had a noticeable pleasant, clean odor, which remained during the greater part of the trip.

It is well known that even slight differences in the handling and icing of individual fish on the vessel may offset any increase in quality resulting from improved cleanliness. In view of this and because of slight differences in the methods of handling and icing the fish on the test vessel, objective tests were not conducted to determine if any extension in the keeping quality of the catch resulted from the use of chlorinated sea water on the vessel. Examination of the fish landed by the test vessel, however, showed that during the period that chlorinated sea water was used, the instances of bilgy and spoiled fish were reduced over previous trips when only sea water was used for washing the fish and the hold of the vessel.

An interesting side effect was noticed by the crew of the test vessel regarding the use of chlorinated sea water. They observed that the chlorinated sea water removed the slime from the deck of the vessel more effectively than did untreated sea water. As a result, the slipperiness of the deck was reduced considerably over that of previous trips when chlorinated sea water was not used. This is an important improvement in safety.

There may be some concern about the possible corrosive effects to the vessel resulting from the use of chlorinated sea water. No evidence has been found to indicate that corrosion is accelerated by the use of sea water containing chlorine in relatively low concentrations of 50 to 60 p.p.m. Apparently, the free chlorine is immediately neutralized upon contact with the organic matter in the hold and, therefore, little or no residual chlorine is left to attack the hull of the vessel or bilge pumps and other equipment. Chlorinated sea water has been used aboard two Boston fishing trawlers for one full year and on several other New England fishing vessels for shorter periods of time. No corrosion of the vessel or related equipment has been observed, other than that which normally occurs due to the presence of salt water. Also, the use of chlorinated sea water has been approved for use on vessels having pen boards and hold linings made of an iron-aluminum alloy. It is felt therefore, that if the installation plan outlined in this report is followed, no corrosion should occur as a result of using chlorinated sea water aboard the vessel.

SUMMARY

Chlorine, having proved effective as a sanitizing agent in fish-processing plants, was used for improving sanitation aboard the fishing vessel. Equipment was installed

on a commercial fishing trawler for chlorinating the sea water used in washing the eviscerated fish at sea and the hold of the vessel in port. The operation of this equipment was evaluated during six regular trips of this vessel.

The chlorinating equipment operated satisfactorily and required little attention. Also, the consumption of a 14-percent sodium hypochlorite solution used for chlorinating the sea water was very low, varying from 30 to 60 gallons for a 10-day trip. This amount can be further reduced by operating the metering pump intermittently instead of continuously.

The chlorinated sea water was effective in washing away the slime and blood from eviscerated fish at sea and in washing the hold of the vessel in port. The free chlorine had no effect on personnel working in the hold of the vessel or on the odor or color of the fish.

No objective tests were conducted to determine quality differences. Observations indicate, however, that there were fewer bilgy and spoiled fish landed by the vessel when chlorinated sea water was used than there were on previous trips of this vessel when plain sea water was used for washing the fish at sea and the fish hold in port.

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FISH FACT

About one-third of the protein consumed daily should come from animal sources such as fish and shellfish to complement incomplete proteins. A single average serving of fish and shellfish supplies enough complete proteins to satisfy the daily requirement.

The edible portion of fish consists of about 18 percent protein and contains all the essential amino acids.



OCEAN PERCH FILLETING MACHINE SUCCESSFULLY FILLETS YELLOW PERCH

A lot of Great Lakes yellow perch shipped from Vermilion, Ohio, was successfully filleted by an ocean perch filleting machine in Gloucester, Mass. The filleting machine had been received from Germany in mid-September 1959 and installed in a Gloucester, Mass., fillet plant. The machine was designed to fillet fish 7-14 inches in length. The yellow perch from Lake Erie have a minimum legal length of $8\frac{1}{2}$ inches, and a maximum commercial length of about 11 inches. The fish that were sent from Vermilion measured about $8\frac{1}{2}$ to 9 inches long.

The trial filleting was quite successful in that about 85-90 percent of the fillets were free from bones. The necessary trimming concerned cutting off a few rib bones, fins, and tag ends. The yield of fillets was about 51 percent by weight. This machine only cuts single fillets. It was estimated that the machine will cut about 1,000 pounds of fillets an hour with two persons feeding the machine and one person packaging. The capacity of the machine is limited by the speed of the feeding lines.

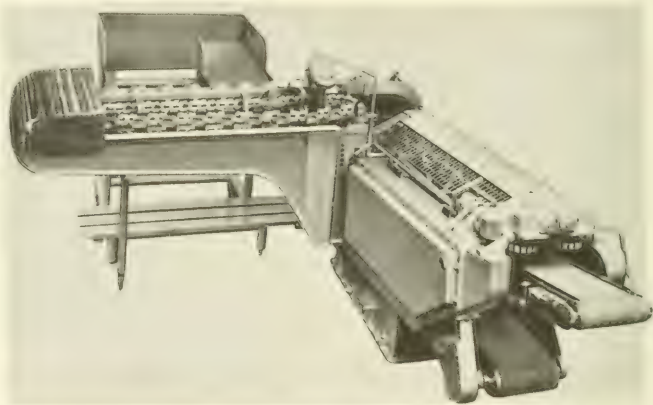


Fig. 1 - German ocean perch filleting machine used for tests on filleting of yellow perch.

The feeding line consists of an endless belt of nylon gutters into which the fish are placed head forward and back to the left. The head is cut off with a circular stainless steel knife while the fish are held in the before-mentioned gutter. The fish are then carried to the filleting part, and are dropped head forward, back up into a gutter. The fish are carried forward principally by means of two rubber belts, one on each side. The first operation of filleting is slitting the belly from head end to tail by means of a vertical circular knife. The entrails are pulled out by means of a stainless steel tooth-edged circular pulley. The fish are then carried forward to a flat inverted "V" which spreads the fish and pressure is applied to the belly walls from on top. Two circular knives cut the fillets while the fish is held on this distance piece. The frame drops below the knives to a belt which car-

ries heads and frames away. The fillets are carried by a second belt to the packing table. The machine is very well built and should be satisfactory for filleting Great Lakes yellow perch.

The price of the German filleting machine is \$27,500 landed, duty paid, ex-dock United States port of entry. All machines are installed by factory-trained technicians who also train the operating personnel with all details as to service and maintenance of the equipment. The cost for the services of such technician is \$25 a day, plus living expenses and travel expenses within the United States.

Note: For the name of the filleting machine and the name and address of the United States distributor, write to the Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington 25, D. C.



LABORATORY WORK ON FROZEN SALMON STEAK STANDARD COMPLETED

The laboratory work on the frozen salmon steak standard is essentially complete. This standard will be in effect by early in 1960.

After the completion of the written standard, the U. S. Bureau of Commercial Fisheries carries out a grading survey to test the applicability of the standard. Based on the examination of 391 sample units (249 retail size units and 142 institutional-size units) taken from processors' warehouses the following findings were noted:

(1) The average point score for the retail size units was 82 points, and for the institutional-size units 88 points. These data indicated that the quality of the institutional-size pack was significantly better than the retail-size pack.

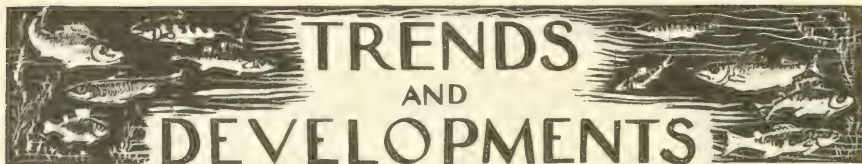
(2) The principal factor contributing to the Grade "B" and "Substandard" classification was flavor, primarily rancidity of the fatty portion.

(3) The percentage glaze, free drip, and cook drip were not considered as factors of quality in grading of the frozen salmon steaks inasmuch as meaningful relationships could not be established.

An example of the close liaison maintained between the standards development and product inspection groups is demonstrated by the following:

The control of net package weights was found to be a serious problem in this survey. Our inspection personnel in following up on this problem during routine checking of net weight noted that the glaze water used in glazing salmon steaks was occasionally at some elevated temperature at the start of the steaking operation. As the steaking progressed, the temperature of the glaze water was continuously lowered until equilibrium temperature was attained. Adjustment for glaze pickup to meet net weight requirements if based on the initially warmer glaze water, resulted in underweight as the glaze water temperature dropped, due to the greater pickup of glaze at these lower temperatures. Thus, in order to control the percentage of glaze and thereby glaze allowance and net weight, the inspector found it necessary to routinely check glaze water temperature in order to protect the processor against excessive overweights or underweights.





TRENDS AND DEVELOPMENTS

Alaska

HEARING ON COMMERCIAL FISHERY REGULATIONS FOR 1960:

The first public hearing on commercial fishery regulations was held by the new State of Alaska when the Fish and Game Commission met at Juneau, November 18, 1959. Comments on proposals for management of the fisheries for 1960 were heard.

This will be the only hearing on 1960 regulations. It is expected that early promulgation of final regulations will follow the hearings so that they may take effect January 1, 1960, which is the date the State assumes management responsibility from the U. S. Bureau of Commercial Fisheries.

If the proposals for 1960 are adopted, these changes will occur: (1) any seiner over 50 feet cannot operate in the State's waters, and the rule extends the limit to include vessels operating west of False Pass; (2) trawling for king crab is banned, and this means fishing for kingcrabs will be limited to pot fishing; (3) drum seining (banned by the U. S. Fish and Wildlife Service in previous years) will be illegal in 1960; (4) preseason registration, similar to State of Washington regulations, will be required by April 15 and transfer of gear will be allowed only by the approval of the Commissioner.



American Samoa

TUNA LANDINGS, JANUARY-OCTOBER 1959:

During October 1959 tuna landings by Japanese and South Korean vessels fishing for the tuna cannery in American Samoa amounted to about 2.3 million

pounds. This amount was 27.4 percent or 885,000 pounds under the landings for

Species	October		Jan.-Oct.	
	1959	1958	1959	1958
	(1,000 lbs.)			
Albacore . . .	2,075	2,637	17,359	18,087
Yellowfin . . .	187	500	3,618	4,685
Big-eyed . . .	78	91	826	965
Skipjack . . .	3	-	7	-
Total . . .	2,343	3,228	21,810	23,737

Note: Most of these tuna were landed by Japanese vessels; a small amount by South Korean vessels.

October 1958. The ten-months 1959 tuna landings of 21.8 million pounds were down 8.1 percent from the 23.7 million pounds landed in the same period of 1958.



California

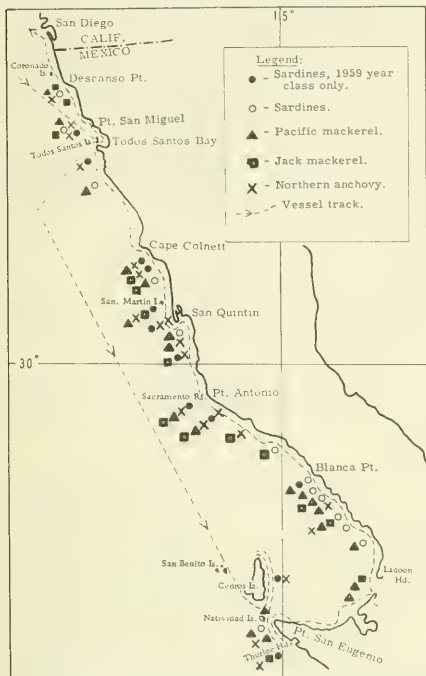
PELAGIC FISH POPULATION SURVEY OFF COAST OF SOUTHERN AND CENTRAL CALIFORNIA CONTINUED:

M/V "Alaska" Cruise 59A7-Pelagic Fish: The coastal waters off Baja California from Turtle Bay northward to Punta San Miguel were surveyed (August 22-September 9, 1959) by the California Department of Fish and Game research vessel *Alaska* to sample young sardines for determining the relative abundance and distribution of fish resulting from the 1959 spawning. Other objectives were to sample adult sardines, Pacific mackerel, jack mackerel, and anchovies; to collect live sardines for the genetic studies conducted by the U. S. Bureau of Commercial Fisheries Biological Laboratory at La Jolla; to tag barracuda; to collect specimens as requested by other investigations; and to troll for albacore while en route to Turtle Bay.

A total of 63 night light stations was occupied. Sardines were collected at 24, Pacific mackerel at 21, anchovies at 18, and jack mackerel at 15.

Sardines were sampled throughout the survey area and were not confined to definitive areas as in previous surveys this year. Of the 24 sardine samples 12 contained 1959 year-class fish and most ranged in size from 80 to 115 mm. standard length. Two samples of young sardine, one collected in Turtle Bay and one in Todos Santos Bay, consisted of smaller fish ranging in standard length from 34 to 70 mm.

A total of 205 miles was scouted between stations at night and 68 schools were sighted. Of this total 11 were identified as anchovy, 5 as sardines,



M/V Alaska Cruise 59-A-7 Pelagic Fish (August 22-September 9, 1959).

and 52 unidentified. Visual scouting conditions were poor with choppy seas prevalent during the first portion of the cruise and adverse bioluminescence prevailed throughout the survey area.

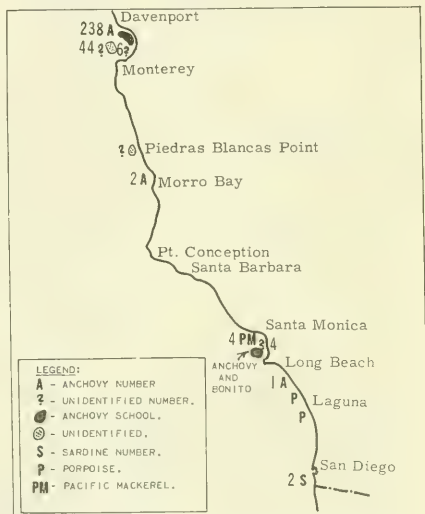
A total of 119 California barracuda was tagged with type "G" spaghetti tags--50 fish were caught at San Martin Island and 69 were captured in the Cape Colnett-Punta San Telmo area. All fish were released in the Cape Colnett-Punta San Telmo area. Two tagged barracuda were recaptured at San Martin Island after being at liberty 108 and 112 days, respectively. Initially the two fish were tagged off Cape Colnett, approximately 30 nautical miles north of the recapture area.

No albacore were taken on the offshore trolling track while en route to Turtle Bay.

Airplane Spotting Flight 59-15-Pelagic Fish: The inshore area from the Mexican border to Davenport was surveyed from the air (September 15-17, 1959) by the Department's Cessna 170 (1359D) to determine the distribution and abundance of pelagic fish schools.

Poor visibility hampered observations between Point Dume and Morro Bay and the first storm of the central California season made observation north of Monterey Bay impossible.

In general, pelagic fish schools were scarce in the region surveyed, Monterey Bay, Santa Monica Bay, and the area off Sierra Nevada Point being the only places where school groups were observed. As had been the case during the two previous surveys, a moderate concentration of anchovies was seen in the northern portion of Monterey Bay. This group consisted of 238 typically thin, spread out, shallow-water schools, extending from the Pajaro River to the town of Santa Cruz and seaward to approximately the 20-fathom curve. The water in this portion of Monterey Bay was quite dirty, ranging in color from gray-brown to brick-red. In addition, 50 large, deep, unidentified schools were seen due west of Moss Landing; 6 were four miles offshore and 44 were 10 miles off at the outer limit of the bay.



Airplane Spotting Flight 59-15 (September 15-17, 1959).

A small group of "breeding" schools was encountered two miles off Sierra Nevada Point. No accurate count or species identification was possible.

On the morning of September 15, near Rocky Point in Santa Monica Bay, it was possible to observe a large number of bonito feeding on a concentration of small anchovies. The anchovy schools had broken up into many very small, tight balls and the area seemed to be completely underlaid with bonito, which could be seen flashing below and through the small anchovy spots. It was apparent that in only a matter of time the anchovies would be completely decimated. Many of the spots became noticeably smaller during the time the airplane was overhead. The erratic and frantic behavior of both the anchovy schools and the bonito made it impossible to estimate the magnitude of

either group although the activity was going on within an area approximately one-half mile square. The Department's research vessel Dolphin was in the area at the time and personnel aboard were able to make positive identification of the species and describe the phenomenon as seen from the surface.

Aside from the aforementioned schools, the following were observed during the flight: 2 small sardine schools off the Coronado Strand; 2 large porpoise schools (several hundred individuals) 2 to 3 miles off Laguna Beach and Newport Beach; 1 large anchovy school near the Huntington Beach pier; 4 unidentified schools near the Redondo Beach barge; 4 thin Pacific mackerel schools south of Malibu pier; and 2 small anchovy schools just north of Morro Rock.

Airplane Spotting Flight 59-16-Abalone: The Channel Islands area was surveyed from the air on September 20, 1959, by the California Department of Fish and Game's Beechcraft to observe locations of commercial abalone fishing and to photograph the Department's abalone experimental stations.



Airplane Spotting Flight 59-16-Abalone (September 20, 1959).

Conditions were favorable for aerial observation and photography, although surf conditions among the northern Channel Islands, San Miguel, Santa Rosa, Santa Cruz and Anacapa were rough for the divers. Diving boats were observed only in the vicinity of San Miguel and Santa Rosa Islands and only 1 of 8 observed was active and had a diver on the bottom. No boats were observed among the southern Channel Islands (San Clemente, Santa Catalina, Santa Barbara and San Nicholas).

Kelp growth appeared to be good around the islands compared to conditions observed in March 1959, although in some areas along the landward side at Santa Catalina and San Clemente, kelp growth was sparse.

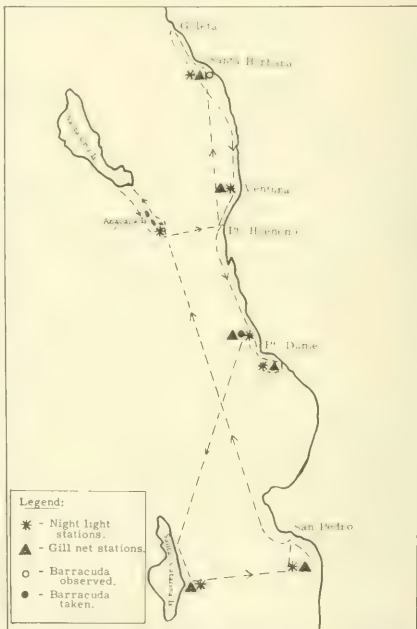
Notes: Also see *Commercial Fisheries Review* September 1959 pp. 20 and 22, and December 1959 p. 39.

BARRACUDA AND WHITE SEA BASS SURVEY OFF SOUTHERN CALIFORNIA COAST CONTINUED:

M/V "N. B. Scofield" Cruise 5986-Barracuda-White Sea Bass: The southern California waters, from

Goleta south to the Horseshoe Kelp off Long Beach and certain offshore islands were surveyed (September 15-23, 1959) by the California Department of Fish and Game research vessel N. B. Scofield. The objectives were: (1) to tag and release barracuda; (2) to explore for currently unexploited groups of barracuda; (3) to explore for small white sea bass in inshore waters; (4) to develop methods of catching small white sea bass in suitable condition for tagging; and (5) to tag white sea bass and either hold them in shipboard tanks and/or release them.

Trolling lines were the principal gear employed for locating barracuda schools: 4 to 8 lines, fished at varying depths, were trolled continuously throughout the trip when traveling at trolling speeds.



M/V Scofield Cruise 5986 Barracuda-White Sea Bass (September 14-23, 1959).

When at anchor for the night gill nets were used, conditions permitting. A floating gill net of variable mesh was fished from the stern of the vessel while an anchored net of 3-inch mesh was fished independently of the vessel.

Other fishing methods included rod and reel employing live bait or artificial lures; a 1,500-watt night light suspended over the water at the stern of the vessel; dip-netting and brailing.

California barracuda were taken at only one station during the trip, a spot 3.8 miles north of Point Dume. The barracuda were captured in a 3-inch cotton gill net, set at right angles to a kelp bed, in approximately 45 feet of water. All but

one of the fish were taken within 18 inches of the lead line. One other barracuda was hooked on live bait at this location but was not landed. The only other barracuda observed on the trip were several fish seen swimming about at the night light station at Santa Barbara.

Because of the scarcity of barracuda the entire trip was devoted to barracuda fishing and no concerted effort was made to take white sea bass.

Water temperatures were fairly uniform throughout the trip with night lows of 18°C . (64°F .), and the daytime highs ranging up to 21.6°C . (70.9°F .). The warmest temperatures during the cruise were encountered at Santa Catalina Island, where the range was from 21.3° to 22.5°C . (70.3° to 72.5°F .).

Bonito were the most abundant species in all areas visited with the largest specimens obtained at Santa Cruz Island. It was difficult to remain and chum in any area for any length of time without attracting a school of these fish to the boat.

In all, 20 different species of fish and 2 species of invertebrates were caught.

Note: Also see *Commercial Fisheries Review*, September 1959 p. 21.

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RADIOACTIVE CONTAMINATION IN FISH AND SHELLFISH TO BE MONITORED:

Increased concern for the possible hazards of atomic energy on California's ocean fish and shellfish has prompted the California Department of Fish and Game to establish a position to deal with radioactive contamination, the Department announced on October 16, 1959

The new position, supervisor of radioactive monitoring and surveillance, will be filled by an expert in biochemistry, chemistry, and game and marine invertebrate zoology.

"The increased activity in the radioactive field in California makes it necessary that the Department determine what is happening to the fish and game resources," the Department stated. "The fact that aquatic and marine organisms have a unique property of concentrating radio-active materials makes this area one of very great concern."

Several areas of concern have already made themselves apparent, he noted. Certain shellfish off northern California are reported to have radio-

active levels many times over the background level of their environment. Some mollusks of southern California likewise are reported to have "warmed up."

The Department will work with other State agencies, particularly the Departments of Public Health, Water Resources, Agriculture, and Industrial Welfare. Analytical work will be carried out in cooperation with the California State Disaster Office. The Department's program will be under the Marine Resources Branch in Sacramento.



Canned Fish

CONSUMER PURCHASES, SEPTEMBER 1959:

Canned tuna purchases by household consumers in September 1959 were 956,000 cases, of which 58,000 cases were imported. By type of pack, domestic-packed tuna purchases were 187,000 cases solid, 615,000 cases chunk, and 96,000 cases grated or flakes. The average purchase was 2.0 cans at a time. About 30.8 percent of the households bought all types of canned tuna; only 1.8 percent bought the imported product. The average retail price paid for a 7-oz. can of domestic solid or fancy was 35.3 cents and for a $6\frac{1}{2}$ -oz. can of chunk 27.7 cents. Imported solid or fancy was bought at 29.4 cents a can. September purchases were lower than the 966,000 cases bought in August by 1.0 percent; retail prices in most cases were slightly higher.

During September household consumer purchases of California sardines were 35,000 cases; and 32,000 cases imported sardines. The average purchase was 1.6 cans at a time for California sardines and 1.9 cans for imported. Only 1.4 percent of the households bought canned California sardines and 2.3 percent imported. The average retail price paid for a 1-lb. can of California sardines was 24.0 cents, and for a 4-oz. can of imported 25.0 cents. Retail prices were lower for both California and imported canned sardines. September purchases of California sardines were higher than the 34,000 cases bought in August by 2.9 percent.

Canned salmon purchases in September 1959 were 198,000 standard cases, of which 103,000 cases were pinks and 44,000 cases reds. The average purchase was 1.2 cans at a time. About 14.2 percent of the households bought all types of canned salmon; 7.0 percent bought pinks. The average retail price paid for a 1-lb. can of pink was 58.5 cents and for red 89.0 cents. September purchases were down about 1.5 percent from the 201,000 cases bought in August.



Cans--Shipments for

Fishery Products, January-August 1959

Total shipments of metal cans for fishery products during January-August 1959 amounted to 79,870 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 78,679

tons in the first eight months of 1958. Canning of fishery products in August 1959 included tuna, Maine sardines, salmon, shrimp, and jack and Pacific mackerel. Shipments of metal cans rose 2.8 percent from July to August 1959, but dropped 15.8 percent from August 1958 to August 1959.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.



Central Pacific Fishery Investigations

SKIPJACK TUNA BEHAVIOR STUDIES OFF HAWAII CONTINUED:

M/V "Charles H. Gilbert" Cruise 46: The study of the behavior of tuna in Hawaiian waters was continued (September 15-October 18, 1959) by the fishery

research vessel Charles H. Gilbert of the U. S. Bureau of Commercial Fisheries Biological Laboratory at Honolulu.

Tuna Behavior Studies: Four skipjack schools were fished for experimental purposes and also to obtain live fish for use in pond studies. Observations were made on tuna behavior during the alternate use of various bait species (moia mixture, mullet, nehu, tilapia), and when the tuna encountered squid, a natural food. Three 6-pound skipjack were inoculated with thorazine and 11 others were confined without drugs. Two drugged fish and 5 controls were transferred to the Kewalo pond where maximum survival was 41 hours. The single dolphin captured died at sea.

California Current Extension Survey: Bathythermograph casts were made at 3-hour intervals throughout the survey and with each cast water samples were collected for salinity determinations. The salinities were determined aboard ship. The results were used to define the general track in the western area. In addition, five water samples were frozen for inorganic phosphate analyses.

The salinity distribution indicated that the northern type water (salinity greater than 35.0 ‰) had penetrated into the waters surrounding the major islands of the Hawaiian chain. The islands in the southeastern portion of the archipelago were completely encompassed by this northern type water, whereas in the northwestern sector high salinity water was located only on the northern side of the islands. The California Current Extension was relatively narrow and pronounced south of the island of Hawaii becoming wide and diffuse to the west.

A total of 29 bird flocks was sighted during the current survey. At least 10 of these flocks were not actively feeding and were observed flying high above the water surface. Live-bait fishing with tilapia as chum was attempted on 1 yellowfin tuna, 1 mahimahi, and 3 skipjack tuna schools. Only one of the skipjack schools responded to the chum and was successfully fished with a catch of 142 fish. Fifty-four were tagged with the Floy dart tag and released. The

skipjack ranged in size from 10-18 pounds.

Long-line gear was fished at 3 locations. The catches were considered poor, both in terms of numbers and species caught. The total catch consisted of 1 yellowfin, 2 big-eyed, and 1 skipjack tuna, 1 striped marlin, 2 sailfish, 4 white-tip sharks, 4 great blue sharks, 4 mahimahi, and 1 *Alepisauris*.

Temperature Discontinuity Studies:

Five $\frac{1}{2}$ -hour surface plankton hauls with a 1-meter net were made across a temperature discontinuity encountered south of the island of Molokai. The temperature gradient consisted of a 1-degree (80.0° F. to 81.0° F.) change in surface temperature which occurred within 5 minutes of traveling at 8-9 knots. Additional data collected were subsurface temperatures at close intervals with the bathythermograph and water samples for both inorganic phosphate and salinity determinations.

Sampling for Serological Studies:

Twenty-four 0-60 meter plankton samples, from which tuna larvae will be

separated, were preserved and frozen in 10-percent formalin, 70-percent methanol, and sea water.

Whole blood samples from eight skipjack were preserved and frozen in a glycerol-citrate solution.

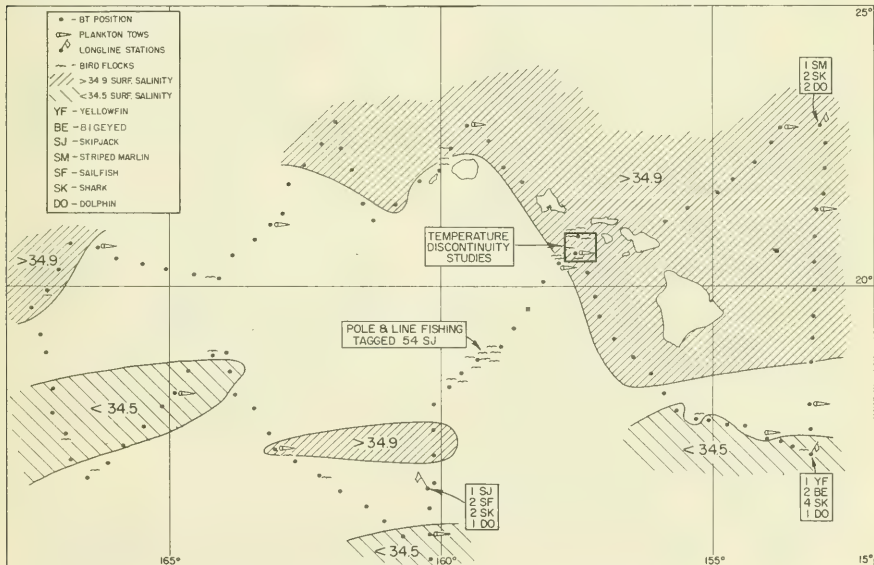
Meat samples from 10 skipjack were frozen and returned to the laboratory.

Note: Also see Commercial Fisheries Review, September 1959 p. 27, and November p. 30.

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STUDIES SHOW SEPARATE STOCKS OF ALBACORE TUNA NORTH AND SOUTH OF THE EQUATOR IN CENTRAL PACIFIC OCEAN:

A study of the sexual maturity and the time and area of spawning of albacore tuna in the central South Pacific Ocean indicates that the stocks north and south of the equator are separate. This study by the Honolulu Fisheries Biological Laboratory of the U. S. Bureau of Commercial Fisheries is based on the examination of gonads collected from albacore landed in American Samoa.



M/V Charles H. Gilbert Cruise 46 (September 15-October 18, 1959).

Albacore are landed in American Samoa throughout the year. A continuous series of samples could thus be obtained for the study of seasonal variation in gonad development. In July 1957, arrangements were made to obtain gonad samples from seven randomly-selected albacore from each landing. Gonads from both sexes were collected to assure complete randomness in sampling. A total of 1,772 pairs were collected during the period July 1957 to September 1958.

At the laboratory the gonads were weighed. No further work was done with the testes. The ovaries were sectioned, examined by microscope, and the stage of development recorded. A sample of 25 of the largest ova were measured.

The relative stages of maturity of the ova were examined with respect to the time of capture. The proportion of ovaries in the "late development" stage increased from July 1957 to a maximum in December-January and declined to a minimum in May 1958. The proportion increased in June 1958. The annual spawning cycle is thus tentatively defined.

The areas of capture, considered along with the relative stages of maturity of the ova, indicate that the South Pacific albacore probably spawn between 10° S. and 20° S. latitude between 140° W. and 170° E. longitude, the eastern and western limits of the area from which samples were received. Those samples of fish caught between 20° S. and 30° S. latitude had ovaries which were not in advanced stages of development.

While there may be some intermingling of albacore stocks across the equator, the November-March (southern summer) spawning season in the South Pacific, as contrasted to the suspected May-August (northern summer) spawning season in the North Pacific, suggests that the stocks in the two hemispheres may be separate. This separation is further suggested by the scarcity of fish between 20° N. and 10° S. latitude as revealed from catches of both commercial and research vessels.

In addition, tagging experiments have shown Pacific-wide albacore movements in the Northern Hemisphere, but no tagged albacore released in the North Pacific have been recaptured in the South Pacific.

The results of the albacore gonad sampling in the South Pacific and studies of the distribution and size composition of albacore in both hemispheres, along with data available from other research activities and from commercial fisheries, all support the hypothesis that there are separate albacore stocks in the two hemispheres and that their distribution approximates a mirror image.



Consumption

SURVEY OF FISH CONSUMPTION IN PUBLIC EATING PLACES COMPLETED:

A survey of the consumption of frozen processed fish and shellfish in institutions and public eating places in ten selected cities has been completed and submitted by the contractor to the U. S. Bureau of Commercial Fisheries.

The survey provides basic marketing data to aid the fishing industry in its continuing efforts to increase the consumption of fish and shellfish. In the course



of this study, approximately 4,400 interviews were obtained in order to determine the proportion of establishments

using frozen processed fish, shellfish, and fish portions; quantities purchased according to species; sources of supplies; attitude as to the quality and condition of the merchandise received from the suppliers; ideas on packaging and profitability of serving frozen processed fishery products; methods of cooking; awareness and usage of government-inspected fishery products; reasons for not using frozen processed fishery products; and other information which might be developed during the interview.

Four classes of establishments were defined for this study and included: establishments primarily engaged in serving foods to the general public (restaurants, cafeterias, etc.); establishments serving food to limited groups of people (schools, industrial plants, commercial enterprises); establishments serving foods to captive groups of people (hospitals, prisons, etc.); and miscellaneous establishments (drug stores, lunch counters, clubs).

The results of the survey will be published in 11 sections, one for each of the cities and a Technical Appendix describing the methods used in the study. Interviews for this project were made in the following cities, Atlanta, Ga.; Chicago, Ill.; Cleveland, Ohio; Denver, Colo.; Houston, Tex.; Los Angeles, Calif.; Omaha, Nebr.; Portland, Ore.; Springfield, Mass.; and New York City.

The work was sponsored by the Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, and was financed with funds provided by the Salton-Kennedy Act to increase production and markets for the domestic fishing industry. The actual field interviews and tabulations were performed by a New York City research firm at a cost of \$57,000.

Note: Also see Commercial Fisheries Review, September 1958 p. 37.



Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE
PURCHASES, JANUARY-OCTOBER 1959:
Fresh and Frozen Fishery Products
For the use of the Armed Forces under

the Department of Defense, 1.9 million pounds (value \$1.1 million) of fresh and frozen fishery products were purchased in October 1959 by the Military Subsistence Supply Agency. This exceeded the

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, October 1959 with Comparisons

QUANTITY				VALUE			
October	Jan.-Oct.	October	Jan.-Oct.	October	Jan.-Oct.	October	Jan.-Oct.
1959	1958	1959	1958	1959	1958	1959	1958
... (1,000 Lbs.) ...				... (\$1,000) ...			
1,945	1,507	19,433	19,382	1,062	855	110,035	111,059

quantity purchased in September by 10.6 percent and was 29.1 percent higher than the amount purchased in October 1958. The value of the purchases in October 1959 was up by 14.9 percent as compared with September and 24.2 percent more than for October 1958.

During the first ten months of 1959 purchases totaled 19.4 million pounds (valued at \$10.0 million)--an increase of 0.3 percent in quantity but lower by 9.3 percent in value as compared with the similar period of 1958.

Prices paid for fresh and frozen fishery products by the Department of Defense in October 1959 averaged 54.6 cents a pound, about 2.0 cents more than the 52.6 cents paid in September and 2.1 cents less than the 56.7 cents paid during October 1958.

Canned Fishery Products: Salmon was the principal canned fishery product pur-

Table 2 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, October 1959 with Comparisons

Product	QUANTITY				VALUE			
	October	Jan.-Oct.	October	Jan.-Oct.	October	Jan.-Oct.	October	Jan.-Oct.
	1959	1958	1959	1958	1959	1958	1959	1958
... (1,000 Lbs.) ...					... (\$1,000) ...			
Tuna	100	-	2,602	3,931	44	-	1,203	1/
Salmon	653	1,381	671	2,783	456	761	470	1/
Sardine	51	-	1,025	93	21	-	165	1/

1/Unavailable.

chased for the use of the Armed Forces during October this year. In the first 10 months of 1959, purchases of canned tuna were lower by 33.8 percent, canned salmon lower by 75.9 percent, but canned sardine purchases increased elevenfold as compared with January-October 1958.

Note: Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated because local purchases are not obtainable.

□ □ □ □ □ □

Federal Aid Funds for Sport Fish and Wildlife Restoration Allotted to States for Fiscal Year 1960

Federal Aid funds totaling \$20.6 million, which includes the last of the five Pittman-Robertson "backlog" allotments of almost \$2.7 million each, have been apportioned to the states for their fish and game restoration programs for the year ending June 30, 1960, the Secretary of the Interior announced on November 18, 1959. Fish restoration funds for fiscal year 1960 amount to \$5.3 million; game restoration, \$15.3 million. The program is administered by Bureau of Sport Fisheries and Wildlife of the U. S. Fish and Wildlife Service.

Apportionments of Federal Aid Funds to States for Sport Fish and Wildlife Restoration, Fiscal Year 1960

States	Sport Fishing	Wildlife
Alabama	\$100,569.39	\$278,169.87
Alaska	263,500.00	790,000.00
Arizona	94,220.77	334,814.01
Arkansas	15,962.61	244,807.77
California	263,500.00	715,651.11
Colorado	117,618.54	351,939.01
Connecticut	52,700.00	79,000.00
Delaware	52,700.00	79,000.00
Florida	106,843.39	222,612.58
Georgia	100,499.30	256,548.51
Hawaii	52,700.00	79,000.00
Idaho	83,269.54	296,603.43
Illinois	154,089.16	394,056.93
Indiana	139,962.69	417,762.83
Iowa	89,789.30	310,712.66
Kansas	83,751.76	300,296.72
Kentucky	82,924.33	249,518.82
Louisiana	57,324.44	261,916.05
Maine	52,700.00	170,568.56
Maryland	52,700.00	105,732.40
Massachusetts	52,700.00	82,929.89
Michigan	214,605.89	487,518.57
Minnesota	263,500.00	368,367.80
Mississippi	58,432.52	221,896.64
Missouri	136,064.65	347,067.67
Montana	123,173.59	473,192.84
Nebraska	74,045.23	274,876.58
Nevada	72,928.50	296,096.40
New Hampshire	52,700.00	79,000.00
New Jersey	52,700.00	99,289.38
New Mexico	88,700.54	350,799.04
New York	148,425.26	608,667.74
North Carolina	87,252.12	312,438.10
North Dakota	52,700.00	231,876.75
Ohio	154,402.37	444,084.00
Oklahoma	110,363.30	266,308.45
Oregon	111,651.99	380,358.49
Pennsylvania	119,178.89	590,597.68
Rhode Island	52,700.00	79,000.00
South Carolina	54,638.58	159,295.84
South Dakota	63,679.06	270,605.25
Tennessee	127,556.15	308,364.23
Texas	263,500.00	790,000.00
Utah	70,748.64	288,155.17
Vermont	52,700.00	79,000.00
Virginia	81,724.27	300,999.00
Washington	98,507.82	308,869.39
West Virginia	52,700.00	194,397.31
Wisconsin	197,180.32	331,460.62
Wyoming	83,515.09	312,323.89

1/ Portion of funds in the aggregate sum of \$523,221.99 temporarily withheld pending receipt of acceptable certification of paid hunting license holders.

These funds are derived from Federal excise taxes collected from the manufacturers--an 11-percent tax on sporting guns and ammunition for the restoration of game (Pittman-Robertson Act, approved September 2, 1937) and a 10-percent tax on fishing rods, reels, creels, and artificial lures, baits and flies (Dingell-Johnson Act, approved August 9, 1950). Both taxes apply on the manufacturer's price.

Guam, which became eligible for Federal Aid in 1958, Puerto Rico, and the Virgin Islands each receive \$12,000 a year for game restoration programs and \$10,000 each for fish restoration.

Federal Aid money is matched by state money on the basis of \$3 Federal Aid to \$1 state funds, although in actual practice the states carry out all projects with their own funds, and are reimbursed for up to 75 percent of project costs.

To obtain the benefits of the Federal grants, the states submit project proposals to the Bureau of Sport Fisheries and Wildlife. When Federal Aid projects are approved by the Bureau, the states fish and game departments proceed to carry out the plans, spending their own funds. The states then submit reimbursement claims for 75 percent of the costs of the project, either periodically or at the completion of the work. All equipment, lands, and structures become the property of the states. All project workers are hired by the states and are state employees.

Note: Also see *Commercial Fisheries Review*, December 1958, p. 34.



Fish Flour

POTENTIAL COMMERCIAL VALUE:

Edible fish flour might well be our most nutritionally-important, economically-valuable, and politically-significant fishery product of the future.

At the fall 1959 meeting of the American Fisheries Advisory Committee in Newport News, Va., the members, their wives, and guests were served chocolate chip cookies made with an ordinary package mix to which 2 tablespoonsful of whole menhaden edible fish flour were added.

None of those present were aware of the addition of fish flour until the concluding speaker told them about it, because the U. S. Bureau of Commercial Fisheries' home economists had made certain that the cookies with fish flour looked, tasted, and crumbled exactly the same as cookies any homemaker might make with the same packaged mix. The

nutritional difference, however, was tremendous.

"If you ate the same number of cookies as I did," the speaker told them, "amazingly enough we got nearly one-fifth of our daily requirement of animal protein."

The fish flour is made tasteless, nearly white, and odorless by removing the last trace of fish oils. The flour will keep nearly indefinitely as samples have been stored at room temperature for more than a year without spoiling.

Fish flour, which is more than 80 percent high-quality protein, can benefit both the fishing industry and the consumer. Industry could prepare fish flour during times when raw fish are in abundant supply for future use when supplies are short. Fish flour, properly dried and defatted, can be shipped and stored easily and inexpensively. In addition, it provides a low-cost additive to other food preparations. The consumer would benefit because nearly two-thirds of the world's population have a need for more animal protein.

Feeding overpopulated nations apparently is not a problem that must be faced only by certain countries. In the future this may be a world-wide problem. The products of the sea apparently hold the answer. It has been estimated that the potential of our oceans is 500 million tons of food annually. A problem remaining after harvesting this potential is one of processing to insure that the harvest is suitable, readily available, and given optimum utilization for food. A satisfactory fish flour offers a solution to this problem.



Fishways

PROBLEMS OF PASSAGE OF FISH OVER OXBOW DAM DISCUSSED AT CONFERENCE:

During the late summer and fall 1959 months, the Idaho Power Company and Federal and State fishery agencies have been considering what temporary or permanent facilities should be used in

passing anadromous fish at the Hells Canyon and Oxbow Dams.

The fishery agencies had contemplated releasing adult fish in the forebay of the Hells Canyon Dam so that they can swim upstream to Oxbow Dam. This would permit the two tributaries just below Oxbow Dam to continue producing anadromous fish runs and reduce excessive hauling of adult fish. The remaining fish bound for spawning areas above would then be collected at the permanent upstream migrant facilities at Oxbow Dam and hauled above Brownlee Dam to proceed to their ancestral spawning area.

It was agreed at a conference held at Washington, D. C., on June 11, 1959, that the Idaho Power Company and the fishery agencies would consider a proposal of the Company to modify an existing order of the Federal Power Commission. The Company proposes passing fish from Hells Canyon Dam directly to the Brownlee Reservoir, thus eliminating from production the tributary streams entering the Snake River below the Oxbow Dam. The principal reason for making this proposal is to cut the cost of fish handling. Several alternative methods of passing fish have been under consideration since the meeting.

The Company, however, has informed the Federal Power Commission by letter of September 4, 1959, that the cost of facilities proposed by the fishery agencies exceeds their proposed method of handling the fish by about \$1,700,000 for original construction cost and exceeds the annual operating cost by \$200,000. The Company has requested a final determination by the Commission in the matter and has requested that a hearing be set at the earliest possible date.



Great Lakes

LAKE SUPERIOR ADVISORY COMMITTEE REPORTS ON FISHERY TRENDS:

The Lake Superior Advisory Committee met about mid-November in Baraga, Mich., to "advise the Great Lakes Fisheries Commission on matters pertaining to sea lamprey control, lake trout rehabilitation, and other related matters." Representatives were present from Minnesota, Wisconsin, Michigan, the Great Lakes Fisheries Commis-

sion, U. S. Bureau of Commercial Fisheries, and U. S. Bureau of Sport Fisheries and Wildlife. It was reported that progress in the control of the sea lamprey has been effected by three methods--mechanical barriers, electrical barriers, and the newer chemical treatment. Much of the control work centered in Michigan and Wisconsin streams and significant reductions have been made in some areas.

Because of the rapid progress in the development and application of methods to control the lamprey, the Commission is actively engaged in means of rehabilitating the lake trout.

The lake trout commercial fishery in the Isle Royale and Minnesota areas was smaller for 1959, the poundage of large trout was less, and the total catch was down, according to a representative from Minnesota. The small one-pound trout was down but the two- and three-pound trout seemed to be plentiful.

Even though there were some encouraging reports of trout in Lake Superior, experts warned not to view the future with optimism. The Superior lake trout production of about 1.5 million pounds in 1959 was 16 percent less than the 1950 production, and 38 percent less than the 1956 catch.

To assist in the rehabilitation program, the U. S. Bureau of Commercial Fisheries is operating two research vessels in Lake Superior. The vessels are experimentally fishing with mesh gill nets and especially designed trawls. This will give information on the younger age-classes of trout, some of which already indicates a severe shortage of young age trout. Fishing over the known spawning grounds gives information on the extent of fall spawning.

In past years eggs have been obtained from Lake Superior for use in the hatcheries, but native fish are now so hard to find, other sources are being sought. In some hatcheries brood stocks are being developed and collections from various inland lakes have been started by Federal and state agencies.

Minnesota will attempt to carry out spawn-taking operations in three inland lakes along the Gunflint Trail area. The lakes are Mousash, Daniels, and Saganaga. Trap and gill nets are used. In addition, the research section planned to use an electrical shocking device to capture mature trout on the spawning grounds. The work will be carried out at night.



Great Lakes Fisheries Exploration and Gear Research

LAKE ERIE EXPLORATORY SMELT FISHING:

The Great Lakes Exploratory Fishing and Gear Research program of the U. S. Bureau of Commercial Fisheries is assisting the commercial industry of the Great Lakes by trying to find new fishery resources. Also included are ways of fishing the resources found by the introduction and development of suitable gear.

A major project, undertaken in cooperation with the Ohio Division of Wildlife, has involved ways and means of profitably catching commercial quantities of smelt in Lake Erie. Using the Bureau-chartered M/V Active, experiments have been conducted with Gulf of Mexico-type trawls and with the adaption of trawling gear to existing Great Lakes fishing vessels.

These efforts have been successful. During the fall of 1959, 7 tons of smelt were landed in one day which shows that trawling for that species in Lake Erie has commercial possibilities.

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EXPERIMENTAL TRAWLING FOR SMELT IN LAKE ERIE YIELDS COMMERCIAL QUANTITIES:

M/V "Active" Cruise 6: Commercial quantities of smelt were taken throughout the deeper waters of east central Lake Erie, between Fairport Harbor, Ohio, and Erie, Pa., during a 17-day cruise (September 22-October 8, 1959) of the U. S. Bureau of Commercial Fisheries chartered vessel Active. The purpose of the cruise was to gather additional information on the smelt fishery potential and to attempt commercial-scale production.



M/V Active Cruise 6 (September 22-October 8, 1959).

Forty-one trawl tows with a 50-foot two-seam balloon trawl, fitted with a one-inch mesh cod-end, produced over 52,000 pounds of smelt and small amounts of burbot, yellow perch, and herring. The best fishing results were obtained in 11-, to 13-fathom depths from Ashtabula to Conneaut, Ohio, where catch rates of smelt (8 to 20 to the pound) ranged from 2,200-5,000 pounds an hour, the best day's fishing yielded 14,000 pounds of marketable smelt. Smaller concentrations of smelt found northwest of Erie, Pa., produced trawl catches up to 1,500 pounds an hour. Gear damage was light.

Four days fishing were lost due to bad weather and winds up to 40 miles an hour. The adverse weather had little observed effect upon the smelt concentrations. Surface schools of emerald shiners were observed in the Conneaut and Erie areas. No seine sets were attempted.

Surface water temperatures were observed to be considerably cooler than during cruise 5 with a range of 66° F. to 68.5° F. Bottom temperatures ranged from 48° F. to 58° F.

Note: Also see Commercial Fisheries Review, December 1959 p. 49.



Great Lakes Fishery Investigations

SURVEY OF EASTERN LAKE SUPERIOR CONTINUED:

M/V "Cisco" Cruise 7: During the cruise the Cisco operated in southeastern Lake Superior from Marquette to Batchawana Bay, as in cruises 1, 3, and 5.

Standard gangs of gill nets were set at 20 fathoms off Marquette; 15 fathoms in Shelter Bay; 35 fathoms in Munising Bay (2 gangs); 25, 50, 75, and 100 fathoms off Grand Marais; and 25, 35, 50, and 70 fathoms in Whitefish Bay. In addition, a standard gang minus the larger mesh sizes (4 to 6 inches) was set at 5 fathoms in Munising Bay.



Research vessel of the Service's Great Lakes Fishery Investigations.

The gill nets set off Marquette took only 5 lake trout, 9 burbot, 8 smelt, and 4 lake herring. The nets in Shelter Bay caught an unusually large number of longnose sucker (255), and little else (3 lake trout, a few whitefish, smelt, herring, a single burbot). The catch in the shallow set in Munising Bay was dominated by yellow perch (95) and round whitefish (56). Small numbers of whitefish, longnose sucker, white sucker, smelt, and one rainbow trout were also taken. The catch from the deeper sets in Munising Bay consisted mostly of *Leucichthys hoyi* (average 150 per set) and whitefish (30 per set), plus a few smelt and 3 lake trout.

A total of 25 lake trout was taken in gill nets at 25 fathoms and one at 50 fathoms off Grand Marais. One of these trout bore a fin-clip indicating it was stocked. Chub catches off Grand Marais were light at 25, 50, and 100 fathoms (45, 75, and 100 chubs, respectively) and moderate at 75 fathoms (141). Catches were mostly *L. hoyi* at 25 fathoms, *L. reighardi* at 50 fathoms, and *L. kiyi* in the deeper sets. A few *L. nigripinnis* and lake herring were taken at all depths. The only other species taken off Grand Marais were burbot (4 at 25 fathoms) and smelt (2 at 25 fathoms).

No lake trout were caught in gill nets set in Whitefish Bay. Chub catches were light at 25 and 35 fathoms (36 and 80, respectively), heavy at 50 fathoms (364) and moderate at 70 fathoms (129). *L. hoyi* made up 86, 80, and 65 percent of the catches at 25, 50, and 70 fathoms, respectively, but was slightly less numerous than *L. reighardi* at 35 fathoms. *L. kiyi*, *L. nigripinnis*, and *L. zenithicus* were caught in only small numbers. Other species were smelt (92 at 25 fathoms), alewife (only one), and an occasional burbot, white sucker, perch, and pygmy whitefish.

Trawling operations were carried out at depths ranging from 3 to 10 fathoms off Marquette, 15 to 25 fathoms in Shelter Bay, and 10 to 20 fathoms off Grand Marais. No age-group 0 lake trout were netted. Catches were mostly ninespine sticklebacks (more than 1,500 per 10-minute tow off Grand Marais) and slimy sculpins, plus a few smelt fry, trout-perch, and age-group 0 alewives. The alewives were taken from a sandy bottom about 3 miles southeast of Marquette and are believed to be the first young alewives taken from Lake Superior.

Surface water temperature averaged about 14⁰ C. (57.2⁰ F.) at the beginning of the cruise and 13⁰ C. (55.4⁰ F.) at the end. Extremes were 15.6⁰ C. (60.0⁰ F.) and 12.8⁰ C. (55.0⁰ F.). The metalimnion for the most part continues to be well defined in deep-water areas.

Cruise 8: Activities of the U. S. Bureau of Commercial Fisheries research vessel Cisco during October 13-29, 1959, were severely restricted due to extremely bad weather. The primary objective of this cruise was to ascertain the general status of the spawning stock of lake trout in the Marquette, Mich., area of Lake Superior, by setting gill nets on known spawning reefs. Four lifts, each of about 4,500 feet of large-mesh (4- to 6-inch) gill net, were made. Only two lake trout, both ripe males, were caught on the reefs. These meager data, of course, suggest a very small spawning stock. Nets set in this area in 1952 and 1953 took 157 and 65 pounds of spawning lake trout per 1,000 feet of gill net, respectively, while nets set this cruise took 0.5 pounds of spawning lake trout per 1,000 feet of net.

Moderate numbers of longnose suckers, and a few burbot and whitefish (the largest 9 pounds) were also caught in the large-mesh nets. Small amounts of 1½- and 2-inch mesh attached to the large mesh took round whitefish (up to 35 per lift), smelt, and longnose dace (*Rhinichthys cataractae*). The stomachs of all species but the dace were examined for lake trout eggs, and none were found.

Standard gangs of gill nets were set at 25, 50, 75, and 100 fathoms off Marquette. The 25- and 50-fathom sets were for 1 night, but the deeper sets were out for 6 nights before they could be lifted. Four lake trout were taken at 25 fathoms, 3 at 50 fathoms, 3 (1 siscowet) at 75 fathoms, and 1 (a siscowet) at 100 fathoms. None of these lake trout were in spawning condition. There were no chubs taken at 25 fathoms, but the chub catch was moderately large (194) at 50 fathoms. At 75 and 100 fathoms the chub catches were large (998 and 343, respectively), possibly because the nets were in the water longer. The chubs were mostly *Leucichthys reighardi* (70 percent) at 50 fathoms, and *L. kiyi* at 75 and 100 fathoms (82 percent and 87 percent, respectively). Other species were *L. hoyi* (50 fathoms) and *L. nigripinnis* (100 fathoms). Also taken in the standard gangs were lake herring (40 each at 75 and at 100 fathoms), burbot (23 at 25 fathoms, 1 at 75 fathoms, and 30 at 100 fathoms), and smelt (30 at 25 fathoms).

Trawls were towed at 20, 25, and 30 fathoms in Shelter Bay. No 0-age class lake trout were caught. Slimy sculpins, ninespine sticklebacks, and trout-perch comprised most of the catches. There were

also a few small smelt and whitefish or related species.

Complete hydrographic data were collected at a regular station in Shelter Bay. Surface water cooled rather rapidly during the cruise, and by the end of the cruise the water became vertically homothermous, or nearly so, in depths less than 30 fathoms. Surface water temperatures ranged from 6.2° C (43.1° F.) to 11.4° C. (52.5° F.)

Note: Also see *Commercial Fisheries Review*, November 1959 p. 27, and December 1959 p. 52.

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WESTERN LAKE ERIE

BIOLOGICAL RESEARCH CONTINUED:

M/V "George L." Cruise 8: Habitat conditions and fish compositions were measured by the U. S. Bureau of Commercial Fisheries research vessel George L. at the 7 "index" stations in western Lake Erie during the first two weeks of October 1959. Scales were taken from samples of commercial landings during the last 2 weeks at several ports on the south shore.

Surface-water temperatures dropped from 70° to 60° F. between October 5 and October 15. Although habitat conditions appeared normal, trawl catches of fish were low. Little food was found in the stomachs of yearling or older yellow perch. This situation was not unusual, however, since a large percentage of perch examined after August 1 had been empty. Catches of young-of-the-year yellow pike were light. Apparently they were becoming too large to be caught efficiently by trawl. Young yellow pike began to appear in trap nets in the Sandusky area in fairly large numbers during October, and by the end of the month they averaged slightly more than 10 inches long.

The samples of yellow pike, sheepshead, yellow perch, and white bass obtained from the commercial catches were adequate, but so few blue pike, cisco, and white fish were caught in October that good samples of these species could not be obtained. The combined catches of "money" fish—blue pike, yellow pike, cisco, and whitefish from Lake Erie in 1959 were the lowest on record.

Note: Also see *Commercial Fisheries Review*, December 1959 p. 50.

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WESTERN LAKE SUPERIOR FISHERY SURVEY CONTINUED:

M/V "Siscowet" Cruise 8: A study of the abundance and distribution of spawning lake trout in western Lake Superior was conducted by the U. S. Bureau of Commercial Fisheries research vessel Siscowet during October 13-29, 1959. Gangs of large-mesh nets (5- to 6-inch mesh stretched measure) were set over spawning grounds known to have been productive in earlier years. Attached to each gang were two small-mesh nets (1½- and 2½-inch mesh) to learn the abundance of other species on the spawning grounds. Each gang consisted of approximately 3,000 feet of large-mesh nets and 600 feet of small-mesh nets. A total of 44,700 feet of large-mesh and 7,050 feet of small-mesh nets was lifted during the cruise.

The spawning grounds were as follows: Sand Island Shoal, York Island Shoal, Oak Island Shoal, Devils Island Shoal, Rocky Island Shoal, Cat Island Shoal, Manitou Island Shoal, Outer Island Shoals (two separate shoals were fished), and Bad River Reef. Two sets were made each on York, Devils, and Rocky Island Shoals, and one set was made on each of the remaining shoals.

Table 1 lists the number of spawning trout taken from each set and the number and identity of associated species taken in the small-mesh nets. All of the 20 spawning lake trout captured were males 22.6 to 33.5 inches long. Sixteen of them were tagged and released. Stomach samples were collected from the associated species for future examination in the laboratory. Stomachs examined on the vessel contained no lake trout eggs.

Spawn-taking operations on Gull Island Shoal and adjacent areas by the Wisconsin Conservation Department took place concurrently with the Siscowet's operations. A total of 194 trout were taken in this operation, only 30 of which were females; 100 fish were tagged and released by Wisconsin Conservation Department and Bureau personnel.

The water temperature during the cruise varied from 44.7° F. on Sand Island Shoal to 49.5° F. on Manitou Island Shoal.

Table 1 - Lake Trout and Other Species Taken from Gill Nets Set on Various Spawning Shoals During the Lake Trout Spawning Period

Date	Location	Depth	Lake Trout	Burbot	Lake Northern Chubs	Lake Herring	Menominee Whitefish	Smelt	Longnose Suckers
		Fathoms							
							(Number of Fish)		
Oct. 14	York Isle Shoal	4-7	-	-	5	8	23	-	25
16	Devils Isle Shoal	8-11	1	2	16	1	8	2	146
19	Cat Isle Shoal	4-8	2	-	29	1	16	1	163
19	Rocky Isle Shoal	4-8	-	3	22	2	25	18	79
20	Manitou Isle Shoal . . .	4-29	3	-	-	9	16	13	76
20	Oak Isle Shoal	4-9	-	1	6	6	27	4	111
22	N. Outer Isle Shoal . . .	4-9	2	-	-	59	36	-	75
22	W. Outer Isle Shoal . . .	4-7	-	-	19	16	29	-	95
24	Devils Isle Shoal	8-9	10	-	4	25	29	-	50
24	Rocky Isle Shoal	4-13	2	-	17	18	15	-	253
28	York Isle Shoal	4-8	-	4	-	64	8	2	20
28	Sand Isle Shoal	4-9	-	-	2	42	10	-	92
29	Bad River Reef	8-9	-	10	-	4	2	12	40

Note: Also see *Commercial Fisheries Review*, December 1959 p. 51.

Gulf of Mexico Gear

Research Program

SHRIMP-TRAWL UNDERWATER PERFORMANCE STUDIES CONTINUED:

M/V "George M. Bowers" Cruise 24: The fifth in a series of cruises planned to study the performance of shrimp trawls was made by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel George M. Bowers between October 20-30, 1959. Due to overcast, squalls, and rough seas throughout the cruise, only 200 feet of underwater movie film was obtained.



King Crab

UNITED STATES AND JAPAN TO EXPAND KING CRAB RESEARCH IN BERING SEA:

Expansion of research on king crab in the Bering Sea was agreed upon on November 3 by Japan and the United States. The decision was made at a committee meeting of the International North Pacific Fisheries Commission which met in Vancouver, British Columbia.

The expanded research program will focus on crab-trawling in the Eastern Bering Sea. It is expected that the studies will lead to unilateral agreements between Japan and the United States for regulation and conservation of the valuable king crab resource.



Lenten Promotion

"IT'S FISH 'N' SEAFOOD TIME" WILL BE THEME FOR 1960:

The commercial fishing industry is now laying plans for its first annual industry-wide Lenten promotion. The theme for the March 2-April 17, 1960, Lenten promotion will be "It's Fish 'n' Seafood Time." Menu variety will be emphasized in advertising, publicity, and merchandising materials.

The U. S. Bureau of Commercial Fisheries will actively participate in this promotion through its consumer education program, as it has done in previous industry-wide promotions, such as "Fish 'n' Seafood Parade." Bureau materials will stress menu variety, ease of preparation, nutritional value, and other health benefits

accruing from increased use of fish and shellfish in the diet.



Maine Sardines

SARDINES OFFERED FOR STUDIES ON EFFECT OF CHOLESTEROL BUILDUP AS CAUSE OF HEART ATTACKS:

A suggestion by a nationally-known heart specialist to institute a controlled diet on 10,000 Americans to study the effects of cholesterol buildup in the cause of heart attacks was one step nearer reality by



an offer of the of the Maine Sardine Council on November 5, 1959, to provide enough sardines to make the test possible.

A Cleveland, Ohio, doctor made the dietary study suggestion at a news conference following the close of the 32nd annual meeting of the American Heart Association.

"The only way to resolve whether or not a high cholesterol content in the blood is a contributing factor to 'coronary' heart attacks," stated the doctor, "is to place enough people on a diet specifically designed to keep the blood's concentration of cholesterol down." He indicated that at least 10,000 people would have to take part in the study to have any significance.

In a telegram to the Cleveland doctor, the Chairman of the Council endorsed the proposal and offered the services of the Maine sardine packers in donating cases of sardines to any institution or group which would undertake the study.

The Council's chairman sent this telegram to the Cleveland doctor:

"Your proposal for a controlled diet study to determine the effects of cholesterol as a key factor in atherosclerosis is one to which the Maine Sardine Council would like to lend its full cooperation.

"At present, the Council, which represents all the packers of sardines in the State of Maine, is sponsoring a study at the Massachusetts Institute of Technology to explore this area in the feeding of animals. While it is hoped that animal experiments will bring forth much

vital information on the effects of cholesterol in the blood, certainly a broad scale study such as you suggested would be of infinitely more significance.

"Studies by the University of Minnesota operating under a contract from the U. S. Bureau of Commercial Fisheries and the Massachusetts Institute of Technology and our own laboratory at Bangor, indicate that small herring, commonly referred to as sardines, are an excellent nutritive source of unsaturated fats.

"Certainly any dietary effort to lower or control the cholesterol level in the blood must include an ample amount of such food.

"The Maine Sardine Council will make available to you or any institution or group selected by you to conduct such a scientific study, free cases of Maine Sardines to include in a controlled diet program."

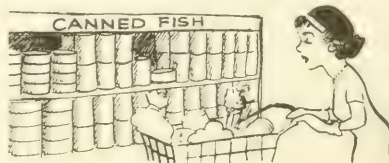


Marketing Surveys to Improve and Expand Markets for Fishery Products

A broad program of market research by contractors under the supervision of the U. S. Bureau of Commercial Fisheries made possible by funds provided by the Saltonstall-Kennedy Act of 1954 includes the following: (1) Motivation Study on Use of Canned Salmon, Tuna, and Sardines by Homemakers; (2) Nationwide Consumer Panel Survey on Canned Fish Consumer Purchases, October 1958-September 1959; and (3) Geographic Distribution of Canned Tuna, Salmon, and Sardines.

Motivation Study on Use or Nonuse of Canned Fish by Homemakers: The promotional problem for canned salmon is not so much one of increasing usage among consumers already using the product, but the persuasion of those who do not use salmon to become users. The problem is the very opposite with canned tuna; the promotional effort must be directed toward increasing consumption among consumers already using tuna,

and particularly among those using the product only occasionally.



These are some of the conclusions contained in a study being completed under a contract with the Bureau. The study directed toward learning what motivates homemakers to use or not to use canned salmon, tuna, and sardines surveyed attitudes in three urban areas, namely, Boston, Mass., Detroit, Mich., and Birmingham, Ala., and in one rural area, Orangeburg County, S. C.

Consumer Panel Survey on Canned Fish Purchases, October 1958-September 1959: Another phase of the Bureau's broad marketing research program directed toward improving and expanding markets for fishery products is a nationwide consumer panel survey of canned fish consumer purchases during the period October 1958 to September 1959.

Report of household consumer purchases of canned tuna, salmon, and sardines have been released to the fishery trade monthly as received from the contractor.

Recently, a report summarizing data on household consumer purchases during the first six months of the study, October 1958-March 1959, was published. This report also covered family characteristics of canned fish consumer purchasers. A full twelve-months report will be made available after completion of this study.

Geographic Distribution of Canned Tuna, Salmon, and Sardines: A first phase report of the U. S. Bureau of Census study of geographic distribution of canned tuna, salmon, and sardines has been received.

This report covers shipments by packers during the six months ending

December 31, 1958. The U. S. Bureau of Census is now preparing a final report covering packer shipments during the twelve months ending June 30, 1959.

This information should be of considerable value to the canned fish segment of the domestic commercial fishing industry in the planning of market operations and to the U. S. Bureau of Commercial Fisheries in planning its consumer education and market development programs.

Note: Also see *Commercial Fisheries Review*, August 1959 p. 28, June 1959 p. 32, November 1958 p. 34.



National Fish Week

"FISH FOR HEALTH" MESSAGE BROADCAST BY ASSISTANT SECRETARY:

Assistant Secretary of the Interior for Fish and Wildlife Ross L. Leffler was interviewed by Don McNeil on his "Breakfast Club Show" before a live



Mr. Leffler being interviewed by Don McNeil on his "Breakfast Club Show."

audience on October 13, 1959. The nationwide broadcast of the transcribed show on October 14 reached some 30 million people through the 436 ABC network affiliates in the United States and Canada and over the Armed Forces Radio Network.

Secretary Leffler's presentation had as its theme "fish for health." This was the first announcement of a major "nu-

tritional breakthrough" which indicates the value of fishery products in lowering cholesterol levels in the blood.

* * * * *

"FISH 'N' SEA FOOD PARADE" PARTICIPATION BY U. S. BUREAU OF COMMERCIAL FISHERIES:

The fifth annual industry-wide "Fish 'n' Sea Food Parade" promotion, held October 19-25, 1959, is now history. Indications are that this was the most successful such promotion to date.



The U. S. Bureau of Commercial Fisheries again actively participated through its consumer education program, which is designed to promote the greater use of domestically-produced fishery products. As its contribution to this promotional effort, the Bureau distributed 75,000 single-sheet promotional leaflets to public and private schools participating in the National School Lunch Program; 25,000 single-sheet promotional leaflets to restaurants throughout the United States; 20,000 single-sheet promotional leaflets to public and private institutions throughout the country; 15,000 38-page fact sheets to newspaper food editors and other food publicists throughout the United States; 3,800 black-and-white food photographs to food editors; television slides, drop cards, and scripts to virtually every television station in the country; public service radio recordings and scripts to all radio stations in the United States; and 300 each of 60-second, 20-second, and 8-second animated public service television shorts to television stations throughout the country.

In addition, Bureau home economists and marketing specialists appeared on

about 60 radio and television stations throughout the United States during Fish 'n' Seafood Parade. Stressed were the nutritional and health values, ease of preparation, and variety of fishery products. In a number of instances, appearances by industry people on radio and television shows were also arranged.

"Fish 'n' Seafood Parade 1959" is an excellent example of a cooperative industry-Government effort.



North Atlantic Fisheries Exploration and Gear Research

ELECTRICAL TRAWL-FISHING TESTS OBSERVED WITH UNDERWATER TELEVISION:

M/V "Cape May": Tests of electrical trawl-fishing by the commercial research vessel Cape May were observed by U. S. Bureau of Commercial Fisheries gear specialists utilizing Bureau underwater television equipment. The tests were made on the southern part of Stellwagen Bank in 11-15 fathoms from September 21 to October 6, 1959.

The underwater television camera was suspended on a chain bridle from the top square of a modified No. 41 trawl looking forward toward the mouth of the net.

The positive electrode was attached to the headrope of the trawl and was hung directly off the bottom in view of the television camera. The negative electrode was trailed on a cable into the cod end. The electronic apparatus of high-power output aboard the M/V Cape May was connected by a heavy rubber-jacketed two-conductor cable to the two V-shaped copper pipe electrodes. Basically, the electronic system charges and discharges a large bank of capacitors through ignitrons at the desired pulse amplitude, width, and frequency.

Because of limitations of visibility, due to turbid water and the narrow angle of camera view, it was not possible to observe the total area in which the electric field was effective. Only the area

of very strong fields close to the positive electrode was seen. The electronic pulsing unit was switched on when fish appeared on the television monitor screen, and all of the species within the camera's field were stunned immediately. While fishing at standard trawl speeds, observations were made on the reaction of various species of fish, including yellowtail flounder (Limanda ferruginea), skate (Raja sp.), and dogfish (Squalus acanthias). The yellowtail flounder and the skate consistently curled up under the influence of the electrical field; flounder from head to tail, and the skate from wing-tip to wing-tip.

At one period during the operation, fish were not in evidence on the monitor screen. However, when the electronic unit was switched on, stunned fish (hake) were seen drifting by the camera in an inverted position into the mouth of the net. These fish continued to enter the net as long as the electric unit was in operation.

A photographic record of fish behavior was obtained from the television monitor screen.



North Atlantic Fishery Investigations

SURVEY OF STOCKS OF JUVENILE HADDOCK ON GEORGES BANK AND VICINITY COMPLETED:

M/V "Delaware" Cruises 12 and 13: Two cruises were made (September 23-October 27, 1959) by the U. S. Bureau of Commercial Fisheries research and exploratory fishing vessel Delaware to survey young-of-the-year haddock and older haddock populations on Georges Bank, the Gulf of Maine, Browns Bank, and the area between Georges Bank and Southern Long Island, N. Y.

The annual census, made by biologists from the Bureau's Woods Hole Biological Laboratory showed that the 1959 year-class, spawned mostly in February and March this year, does not appear to be a particularly strong one. Juvenile haddock were much less abundant on the eastern part of Georges Bank than they were in 1958, about the same as in 1958 on Browns Bank, but somewhat more abundant in the South Channel area. On

the average the 1959 haddock year-class does not appear to be as strong as the one produced in 1958. Fish of the 1959 year-class will be large enough to be taken by commercial boats with legal, large-mesh nets late in the summer and fall of 1961.



The Service's research vessel Delaware.

The 1958 year-class, due to enter the fishery in the summer and fall of 1960, was found to be abundant during the 1958 census cruises. A reassessment of the strength of this year-class will be made on the basis of the number of one-year old fish in the samples collected in September-October 1959 cruises. When an analysis of samples has been completed an announcement will be made regarding a revised estimate of the strength of the 1958 year-class.

The success of this 1958 year-class is particularly important to the New England groundfish industry, currently finding haddock at its lowest level of abundance in many years. Since about 1948 haddock populations on Georges Bank consisted of strong broods in even-numbered years and weaker ones in odd numbered years, but this sequence was broken when 1956 turned out to be a poor year for the survival of young fish. Since the intensive fishery depends on frequent successful broods to keep up the supply of fish on the banks, the relatively weak 1955, 1956, and 1957 year-classes have

considerably diminished the number of fish available to the New England trawlers.

Fortunately the abundance of cod has increased somewhat as the abundance of haddock has decreased, and Bureau biologists state that this species should be relatively abundant for another year or longer.



North Pacific Exploratory Fishery Program

EXPLORATORY SHRIMP FISHING OFF CENTRAL ALASKA:

M/V "John N. Cobb" Cruise 44: Exploratory shrimp fishing operations were conducted off the central Alaska coast between October 14-November 13, 1959, by the U. S. Bureau of Commercial Fisheries' exploratory fishing vessel John N. Cobb.

A total of 101 exploratory drags was made in the area from east of the Pyle Islands to and including Prince William Sound at various depths between 20 and 233 fathoms. Except when snags were encountered, drags were of 30 minutes duration. All drags were with a 40-foot, flat, Gulf-of-Mexico-type shrimp trawl on a 5 feet x 2½ feet 150-pound doors using a single warp and a 20-fathom bridle.

Pink shrimp (*Pandalus borealis*) and sidestripe shrimp (*Pandalopsis dispar*) were found in all waters fished at depths deeper than 40 fathoms. The largest catches during the explorations were made during two drags outside of Day Harbor: one drag, 1½ miles north of Resurrection Cape, in 68-84 fathoms, yielded 330 pounds (heads on) of mixed pink and sidestripe shrimp; and another drag, 8 miles south southeast of Whidbey Bay, in 55-59 fathoms, also resulted in a catch of 330 pounds of mixed shrimp. Poor bottom conditions in both areas limited the length of drags. Twelve other drags in various localities produced from 100 to 300 pounds of shrimp each, and the remaining 87 drags yielded less than 100 pounds each.



'M/V John N. Cobb Cruise No. 44 (Oct.-Nov. 1959).

A total of 600 pounds of marketable Pacific ocean perch (*Sebastes alutus*) was taken in a drag 16 miles east of the Pye Islands in 90-102 fathoms. The majority of the incidental fish catches, however, were predominantly nonmarketable fish such as turbot, pollock, eulachon, and sculpins, and miscellaneous invertebrates, including various starfish, sea anemones, and tanner crabs. (See map above.)



Oysters

EFFECT OF COPPER BARRIERS ON OYSTER MEATS STUDIED:

The presence of copper in the experimental oyster drill barrier used in Chincoteague Bay, Va., to surround oyster beds poses a problem of possible increased copper in the oyster meats.

Many samples of oysters have been collected by shellfish biologists of the

U. S. Bureau of Commercial Fisheries at graduated distances from the barrier, and the meats examined. No excessive accumulation of the metal, whether they came from inside or directly outside the barrier-enclosed large beds, was revealed. However, in very small enclosures and in laboratory aquaria, the impounded oysters exposed to copper appeared to be greener in color than the controls. Precise analysis of the meats of these latter oysters will be made for copper content to evaluate the visual tests first used to check copper intake.

* * * * *

PRODUCTION ON ATLANTIC COAST IN 1959/60 MAY HIT NEW LOW:

The Atlantic Coast 1959/60 oyster season will probably go into the record as the year of lowest production of oysters. The Atlantic Coast industry, north of Chesapeake Bay, has reached a new low. Practically no oysters will be produced from the entire Delaware Bay system and the Long Island yield will be far

below its 1950/51 level. Even, the Chesapeake oysters will be less abundant than they were in 1958/59 and far below five years ago.

A heavy summer death rate in the Lower Chesapeake Bay in Virginia is the major factor in this decline in yield. Coupled with a limited supply of oysters on the public beds in Maryland, the prospects are gloomy indeed.

This scarcity of oysters has resulted in high prices for all shell stock and in rapid price increases for shucked standards, selects, and extra selects. The prices for these grades are the highest on record. Some packers and repackers predict even further increases, although some report buyer resistance.

While this difficult picture characterizes the Atlantic Coast, the Gulf and Pacific Coast oyster growers and packers indicate a somewhat more stable production equal if not in excess of 1958/59.

This could well mean that the total financial return this season will be as high as 1958/59, even though the overall production will drop.

* * * * *

UNITED STATES OYSTER PRODUCTION, 1958 WITH COMPARISONS:

Over a period of nine years (1950-1958), United States production of oysters has declined steadily. Production

State	1958	1957	1954	1950
	(1,000 Lbs.)			
Maine	4	6	6	-
Massachusetts . .	113	152	174	228
Rhode Island . .	3	3	112	922
Connecticut . .	156	244	443	3,577
New York	1,057	1,067	1,708	8,787
New Jersey . . .	829	2,720	7,329	7,242
Delaware	2,410	4,194	4,340	2,141
Maryland	12,026	14,144	20,363	14,406
Virginia	25,503	20,090	21,224	15,547
North Carolina .	1,041	1,086	1,009	1,322
South Carolina .	1,437	1,845	2,562	1,374
Georgia	143	112	217	308
Florida	825	736	690	903
Alabama	458	1,291	739	2,070
Mississippi . . .	579	863	977	508
Louisiana	8,265	10,490	8,361	8,715
Texas	311	953	699	125
California	1,159	1,359	74	39
Oregon	508	429	436	976
Washington . . .	9,570	9,874	10,459	7,225
Total	66,397	71,658	81,922	76,415

of oysters during the 1950-58 period has been relatively stable in the east coast areas south of Delaware, the Gulf of Mexico area, and on the West Coast, but the drop has been very sharp for the oyster-producing areas located in Delaware Bay; Great South Bay, Long Island, N. Y.; Long Island Sound; Narragansett Bay in Rhode Island; and Buzzards Bay in Massachusetts. Production of oysters in northern California increased sharply following the large-scale planting of Japanese oyster seed in 1955-56.



Salmon

ALASKA'S 1959 SALMON PACK LOW, BUT ESCAPEMENT FAIR:

As of October 11, 1959, Alaska's salmon pack amounted to only 1,770,795 cases (48 1-lb. cans) as compared with a total of 2,989,290 cases packed by October 1, 1958. Alaska's pack of salmon in 1959 was the lowest since 1900. There were slight increases in 1959 in the Alaska pack of sockeye or red salmon and king salmon, but sharp declines in the pack of pink salmon (637,714 cases as compared with 1,583,198 cases) and chum salmon (410,758 cases as compared with 758,891 cases). In Southeastern Alaska there was a slight gain over the cycle year (1957) in pink salmon, but a disastrous decline in the pack of chums. In Central Alaska both the pink and chum salmon packs were down drastically, particularly pink salmon (only 165,681 cases in 1959 as compared to 809,937 cases in 1958).

The severe drop in the pack of pink salmon was not reflected in the escapement. The salmon escapement to the salmon streams although far from excellent, was relatively good as compared with the pack.

* * * * *

BRISTOL BAY RED SALMON RUN PREDICTION FOR 1960:

Representatives of the Alaska Department of Fish and Game, Fisheries Research Institute of the University of Washington, and the U. S. Bureau of Commercial Fisheries met in Juneau

November 11, 1959, to consider the possible size of the red salmon run in Bristol Bay in 1960. Background information which was available to the three agencies and "pooled" for the study included the number and age of red salmon which had spawned in past years, the abundance of young salmon which had migrated to the ocean in recent years, and the abundance of immature red salmon in the ocean in recent years. As a result of the varying indications derived from these data two estimates were made. The first was based on the average relationship between number of spawners and the resulting run, and the second was based on the abundance of young salmon migrating to sea combined with the abundance of immature red salmon in the ocean. The first method resulted in the prediction of a run of 18 million red salmon in Bristol Bay in 1960 and the second method of a run of 35 million red salmon. The actual 1960 run can be expected to deviate considerably from either prediction, although the three agencies believe that the most probable total run will be between these two estimates.

Most of the difference in the two predictions lies in the estimates for the Kvichak River. In 1956 there was an unusually large number of spawning red salmon in this system and the Bristol Bay run in 1960 will depend primarily on the success of this spawning and the proportion that returns in 1960 as 4-year-old fish.

The fisheries agencies emphasized that the estimates will be effected by the size of the Japanese high-seas catch in 1960. The run of red salmon in Bristol Bay will be decreased in proportion to the take of red salmon on the high seas by Japanese fishermen.



South Atlantic Exploratory Fishery Program

EXPLORATORY TRAWLING SURVEY OFF SOUTH CAROLINA AND GEORGIA COASTS:

M/V "Silver Bay" Cruise 19: The second in a series of cruises to assess the

commercial fishing potential off the South Atlantic Coast was made by U. S. Bureau of Commercial Fisheries chartered fishing vessel Silver Bay between October 14-29, 1959. During the cruise 70 trawltows were made in 5-50 fathoms between Little River Inlet, S. C., and Brunswick, Ga.

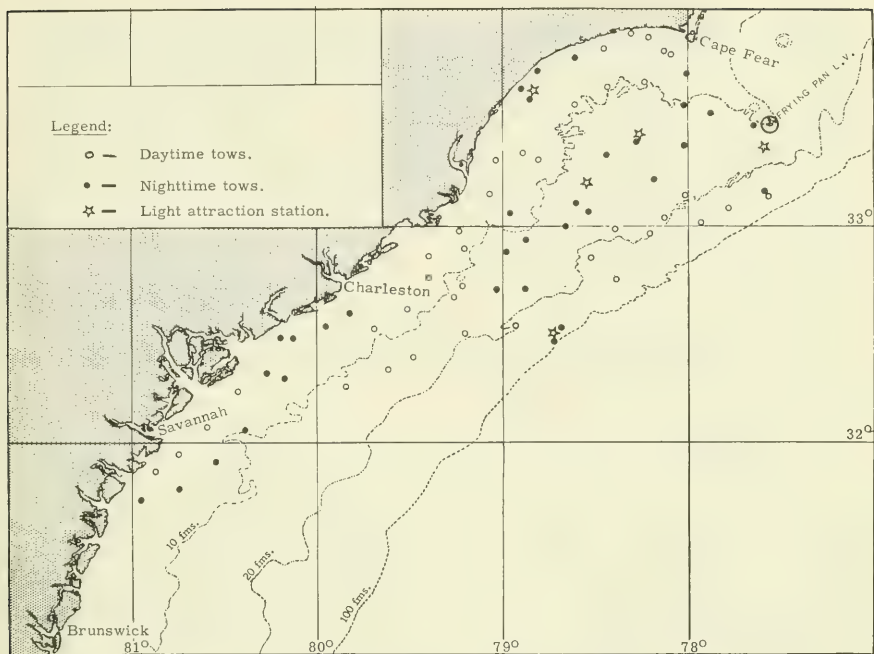
Trawling gear consisted of 60/80-foot (60-foot headrope and 80-foot footrope) and 64/84-foot two-seam shrimp trawls equipped with 6-inch rollers and 54/74-foot fish trawls equipped with 24-inch rollers. All trawls were fished with tickler chains.

Shrimp: Most of the fishing was conducted inside of the 20-fathom curve (60 drags), along the outer edge and adjacent to known shrimp grounds. Thirty-six drags inside of 10 fathoms yielded white shrimp (*Penaeus setiferus*) in 9 drags, brown shrimp (*P. aztecus*) in 15 drags, and pink shrimp (*P. duorarum*) in 12 drags. All three species were present in the same drag on two occasions. The highest catch rate for a combination of these shrimp species was 17 pounds (heads-on) per hour. Twenty-four drags between 10 and 20 fathoms caught small numbers of pink shrimp in 6 drags and a single brown shrimp. Average sizes for whites, browns, and pink shrimp ran 21-25 count (heads-off). Rock shrimp (*Sicyonia*) were most frequently encountered between 10 and 20 fathoms; however, the best catch (10 pounds) was made in 50 fathoms.

Fish: Fish catches were small over the entire area. Porgy or scup, croaker, and spot made up the bulk of the catch which generally ran below 100 pounds an hour, although a one-hour drag in 19-21 fathoms caught 1,750 pounds of porgy, vermillion snapper, and several miscellaneous species.

A few red snapper and grouper were taken in two of the six drags between 40 and 50 fathoms. Catches of up to 30 pounds of flounder (fluke) were also made in this range.

Biological material representative of the area was collected and preserved for future study by a member of the staff of the Bureau's Biological Laboratory, Brunswick, Ga.

M/V Silver Bay Cruise 19 (October 14-29, 1959).

Spotted Sea Trout

TAGGING TO DETERMINE GROWTH RATES AND MIGRATIONS:

A study to determine growth rates and migrations of spotted sea trout (*Cynoscion nebulosus*) off the west coast of Florida by tagging is being conducted by The Marine Laboratory of the University of Miami. Returns indicate that the tagged spotted sea trout do not travel far from the point of release.

A total of 3,759 sea trout have been tagged, of which 220 tags have been returned from fish released in the Fort Myers, Cedar Key, and Appalachicola,

Fla., areas. All but 4 of the tagged fish were caught within 30 miles of the tagging site. The longest migration of a single fish was from Appalachicola, Fla., to Grand Island, La., or about 265 miles west from the tagging area.

Two types of tags are being used in the experiments. One is an internal small green oval plastic tag that is inserted in the body cavity of the fish and is found when the fish is cleaned. The second type is a yellow plastic tube about two inches in length attached to an internal tag. The plastic tube protrudes from the body of the fish to aid in detection.



Standards

TWO HEARINGS HELD ON FROZEN SALMON STEAK STANDARDS:

Two open meetings were scheduled for final hearings on the United States Standards for Grade for Frozen Salmon Steaks. The meetings were conducted by technologists of the U. S. Bureau of Commercial Fisheries prior to promulgation of the Standards in the Federal Register early in 1960. An invitation to attend the hearings was extended to packers, brokers, distributors, users, and others interested in the grade standards for frozen salmon steaks.

The first meeting was scheduled November 23 at Seattle, Wash. The second meeting was held on November 30 at New York City.



Striped Bass

GOOD FISHING PREDICTED FOR POTOMAC RIVER AND CHESAPEAKE BAY IN 1960:

In 1960 fishing for striped bass (rockfish) in the Potomac River and Chesapeake Bay promises to equal and perhaps exceed the record-breaking 1958 harvest, according to a prediction made by State and Federal biologists.

A biologist of the Maryland Chesapeake Biological Laboratory reported that a whopping crop of Potomac River 1½-year-olds should reach the legal 12-inch minimum size by April or May 1960. His observations have been confirmed by other observers.

Support for the bonanza prediction came in the last two weeks when the biologists and his assistants, looking for fish to tag, noted an unusually large proportion of 10- and 11-inch striped bass in Potomac River pound nets.

Scientists had seen indications of a very large crop during 1958/59 winter-trawling and tagging operations, but felt more evidence was needed before making a prediction. A creel census during the summer helped when it revealed anglers were plagued with undersized fish.

The good news is a fringe benefit of a three-year project involving scientists from the Maryland Laboratory, the Virginia Fisheries Laboratory, and the U. S. Fish and Wildlife Service.

Completing its first year, the cooperative research is attempting to sketch the life history of the striped bass in a typical Chesapeake Bay estuary, and to discover how fast this species are caught, and by whom.

Biologists are checking Potomac River fish concentration areas with trawls, tracking fish by releasing tagged fish, and noting where they are caught, and collecting size and abundance data by creel census and commercial catch records.

Since the winter of 1958/59, 3,600 Potomac River striped bass have been tagged with oblong yellow plastic tags fastened with nylon thread through the hind part of the fish's back. Each tag is worth \$1 to the fisherman who mails the tag plus details on where, when, and how the fish was taken to the U. S. Fish and Wildlife Service Laboratory in Beaufort, N. C. About 1,000 tags have been returned, leaving tags worth about \$2,600 on fish yet to be caught.

Returns to date suggest that while some Potomac River striped bass venture far afield, most tend to stay put in home waters.

The 1959 winter-trawling program, which lasted three weeks, upset the previous suspicion that striped bass concentrate only in deep holes in cold weather. Instead, scientists netted fish spread widely over a 35-mile stretch of river, at depths of 30 to 100 feet. The fish were quite active in spite of water temperatures from 34° to 37° F.

The 1959 summer creel census yielded useful data on the sports catch although it was primarily intended to test data-gathering methods. A full-scale census will be undertaken in the summer and fall of 1960.

The Maryland Laboratory director said the Potomac River project is an example of what can be accomplished

through interstate and interagency cooperation. Without such, a really full-scale study of the striped bass fishery would be years in the future. "This program is the first really adequate attempt to provide fishery management with worthwhile tools needed badly," the Director stated.

He added, "If the striped bass' tendency to stay in home waters, such as the Potomac River, is verified, a possible outcome could be that agencies could manage the River as a unit independent from the Chesapeake Bay fishery. Future research in the larger bay will benefit considerably from experience gained in the Potomac River. The two bodies of water have a remarkable resemblance."



Tuna

PURSE SEINING FOR TUNA OFF MASSACHUSETTS IN 1959 SUCCESSFUL:

In 1951, a New England bluefin-tuna project was initiated by what is now the U. S. Bureau of Commercial Fisheries to determine the feasibility of establishing a commercial tuna fishing industry in the New England region. In that and succeeding years, a number of types of gear were used in extensive areas off that area's coast. By 1954 it had been established that bluefin could be taken in commercial quantities, at least during the summer months, with purse-seine gear in inshore waters.

The Bureau, having thus established the availability of the tuna and having found an efficient gear with which to capture them, made an offer to loan any commercial fisherman a seine net, accessory gear, and technical advice if that fisherman would convert his vessel to tuna seining and make available to the public any pertinent information. There were no takers. The resource lay untapped.

But in 1958, a Provincetown, Mass., fisherman with a small otter trawler became interested in the project and accepted the Bureau's 1954 offer. During the first season of operation, catches of sufficient size were made to indicate the

commercial feasibility of this fishery. Between July 24 and October 4, 1958, 38 sets were made and a total of 179 short tons of bluefin tuna was landed.

The vessel spent the winter of 1958/59 trawling and recommenced the cooperative tuna-seining operation on August 2, 1959, again using the Bureau-owned equipment. With a crew of nine men and in 21 trips, the small vessel had taken a total of 696 tons of tuna by the end of the season on September 26--in an inshore area in the vicinity of Provincetown, Mass.



United States Fishing

Fleet ¹/₂ Additions

AUGUST 1959:

A total of 36 vessels of 5 net tons and over were issued first documents as fishing craft during August 1959--a decrease of 22 vessels compared with the same month in 1958. The Gulf area led with 14 vessels, while the South Atlantic area was second with 8 vessels, followed by the Pacific area with 7 vessels.

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft by Areas, August 1959

Area	August		Jan. -Aug.		Total
	1959	1958	1959	1958	
	(Number)				
New England . . .	1	-	11	10	13
Middle Atlantic . .	-	2	6	11	13
Chesapeake . . .	4	10	60	65	99
South Atlantic . . .	8	18	67	94	135
Gulf	14	20	102	198	270
Pacific	7	5	77	89	112
Great Lakes . . .	-	-	5	5	10
Alaska	2	3	30	27	31
Virgin Islands . .	-	-	-	1	1
Total	36	58	358	500	684

Note: Vessels have been assigned to the various areas on the basis of their home ports.

During the first eight months of 1959, a total of 358 vessels were issued first

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft by Tonnage, August 1959

Net Tons	Number
5 to 9	16
10 to 19	7
20 to 29	7
30 to 39	1
40 to 49	5
Total	36

documents as fishing craft--142 below the same period of 1958. Most of the decline occurred in the Gulf area where 96 fewer ves-

sels were documented in 1959 than in 1958.

¹/Includes both commercial and sport fishing craft.

* * * * *

SEPTEMBER 1959:

A total of 41 vessels of 5 net tons and over were issued first documents as fishing craft during September 1959--a decrease of 24 vessels compared with the same month in 1958. The Gulf area continued to lead with 15 vessels. The Chesapeake area was second with 9 vessels, followed by the Pacific area with 7 vessels.

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft by Areas, September 1959

Area	September		Jan.-Sept.		Total
	1959	1958	1959	1958	1958
	(Number)				
New England	2	1	13	11	13
Middle Atlantic	4	-	10	11	13
Chesapeake	9	4	69	69	99
South Atlantic	2	16	69	110	135
Gulf	15	33	117	231	270
Pacific	7	7	84	96	112
Great Lakes	1	1	6	6	10
Alaska	1	3	31	30	31
Virgin Islands	-	-	-	1	1
Total	41	65	399	565	684

Note: Vessels have been assigned to the various areas on the basis of their home ports.

During the first nine months of 1959 a total of 399 vessels were issued first documents as fishing craft--166 below the same period of 1958. Vessels receiving first documents from the Gulf States area dropped 114 below the 1958 nine-month period.

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft by Tonnage, September 1959

Net Tons	Number
5 to 9	21
10 to 19	10
20 to 29	4
30 to 39	2
40 to 49	2
50 to 59	1
160 to 169	1
Total	41

United States Fishery Landings, January-September 1959

Landings of fish and shellfish in the United States during the first 9 months of 1959 totaled over 3.6 billion pounds--about 11 percent higher than for the same period of 1958.

Menhaden landings amounted to 1,851 million pounds during the first 9 months of 1959--a gain of 534 million pounds compared with the same period the preceding year. Landings of jack and Pacific mackerel increased along the Pacific Coast by 7 and 10 million pounds, respectively, during the nine-month period. In the South Atlantic and Gulf States, shrimp landings exceeded those of the previous year by 9 million pounds. In New England, whiting landings also recorded a rise of 9 million pounds.

During the first 9 months of 1959, landings of haddock and ocean perch in New England were down 8 and 13 million pounds, respectively. There was also a 16-million-pound decline in the yield of industrial fish in this area.

Table 1 - United States Fishery Landings of Certain Species for Periods Shown, 1959 and 1958 1/

Species	Period	1959	1958	Total 1958
..... (1,000 lbs.)				
Anchovies, Calif.	9 mos.	2,200	6,322	8,148
Cod:				
Maine	8 mos.	2,300	2,400	2,735
Boston	9 "	14,300	13,139	16,183
Gloucester	9 "	2,400	2,321	3,189
Total cod		19,000	17,860	22,107
Haddock:				
Maine	8 mos.	2,400	2,973	3,997
Boston	9 "	60,100	70,391	81,509
Gloucester	9 "	10,800	8,368	9,798
Total haddock		73,300	81,732	95,304
Halibut 2/:				
Wash. and Oreg.	9 mos.	17,100	15,411	16,200
Alaska	9 "	21,400	19,888	19,888
Total halibut		38,500	35,299	36,088
Herring:				
Maine	8 mos.	83,200	106,474	170,977
Alaska (season over)	9 "	110,000	88,801	88,801
Industrial fish, Maine & Mass. 3/	9 mos.	88,700	105,000	108,869
Mackerel, Calif.:				
Jack	9 mos.	17,800	10,918	21,698
Pacific	9 "	23,500	13,504	24,624
Menhaden	9 mos.	1,851,100	1,316,925	1,544,700
Ocean perch:				
Maine	8 mos.	51,100	52,494	71,068
Boston	9 "	2,200	1,826	2,626
Gloucester	9 "	50,300	62,529	74,951
Total ocean perch		103,600	110,849	148,644
Salmon:				
Wash. 4/	9 mos.	33,500	44,906	54,363
Oreg. 4/	8 "	4,300	6,701	8,179
Alaska	to Oct. 11	141,700	239,143	241,255
Sardines, Pacific	10 mos.	38,900	141,500	207,429
Scallops, sea, New Bedford (meats)	9 mos.	14,300	12,014	15,253
Shrimp (heads-on):				
South Atl. & Gulf	9 mos.	88,700	79,577	195,808
Washington	9 "	2,700	6,306	6,730
Oregon	8 "	2,400	1,392	1,523
Alaska	8 "	9,500	4,850	7,662
Squid, Calif.	9 mos.	15,700	4,862	4,864
Tuna, Calif.	to Oct. 9	236,400	269,004	307,378
Whiting:				
Maine	8 mos.	21,900	22,600	23,577
Boston	9 "	000	335	596
Gloucester	9 "	53,800	44,578	58,927
Total whiting		76,300	67,513	83,100
Total of all above items		3,075,300	2,777,458	3,403,704
Others (not listed)		538,800	542,366	1,312,296
Grand total		3,614,100	3,319,824	4,716,000

1/ Preliminary. 3/ Excluding menhaden.
2/ Dressed weight. 4/ Landed weight.

Table 2 - United States Fishery Landings by States for Periods Shown, 1959 and 1958 1/

Area	Period	1959	1958	Total 1958
		..... (1,000 lbs.)		
Maine	8 mos.	186,300	214,045	316,955
Massachusetts 2/:				
Boston	9 mos.	89,000	100,334	123,764
Gloucester	9 "	197,400	185,102	230,218
New Bedford	9 "	89,800	89,103	111,669
Provincetown ..	9 "	21,500	17,957	25,754
Total Mass.		397,700	392,496	491,405
Rhode Island 3/...	8 mos.	84,900	70,562	103,452
New York 3/.....	8 "	26,000	28,176	42,063
New Jersey 3/...	9 "	42,700	37,953	50,933
North Carolina 3/	9 "	45,400	45,450	54,866
South Carolina 3/	9 "	11,800	11,586	15,359
Georgia	8 "	11,900	11,612	20,066
Florida 3/.....	8 "	85,300	95,073	158,724
Alabama	7 "	7,700	5,395	10,343
Mississippi 3/...	7 "	10,600	8,002	82,476
Louisiana 3/.....	5 "	24,600	28,800	75,237
Texas 3/.....	8 "	40,700	35,463	80,478
Ohio (Mar.-Aug.)	8 "	14,600	13,798	19,145
Oregon 2/.....	8 "	36,000	44,112	59,467
Washington 2/....	9 "	113,000	122,887	164,987
California:				
Certain species 4/	9 mos.	334,500	446,110	581,199
Other	6 "	42,100	42,524	82,709
Total Calif.		376,600	488,634	663,908
Rhode Island, Middle Atlantic, Chesapeake, South Atlantic, and Gulf States (menhaden only)	9 mos.	1,815,700	1,313,092	1,540,867
Alaska:				
Halibut 5/.....	9 mos.	21,400	19,888	19,888
Herring (season over)	9 "	110,000	88,801	88,801
Salmon	to Oct. 11	141,700	239,143	241,255
Shrimp	8 mos.	9,500	4,856	7,862
Total of all above items		3,614,100	3,319,824	4,308,537
Others (not listed)		6/	6/	407,463
Grand total		6/	6/	4,716,000

1/ Preliminary.

2/ Landed weight.

3/ Excluding menhaden.

4/ Includes catch of anchovies, jack and Pacific mackerel, Pacific sardines, squid, and tuna. Data on tuna are for the season to October; data on Pacific sardines are for a ten-months period.

5/ Dressed weight.

6/ Data not available.

Note: Data principally represent weight of fish and shellfish as landed except for mollusks which represent the weight of meats only.

Landings of menhaden, Alaska herring, and industrial fish in Maine and Massachusetts used in the manufacture of meal and oil comprised 57 percent of the production during the first 9 months of 1959. This was 11 percent more than for the same period of 1958.



U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, SEPTEMBER 1959:

Imports of edible fresh, frozen, and processed fish and shellfish into the United States during September 1959 increased by 11.2 percent in quantity and 13.7 percent in value as compared with August 1959. The increase was due primarily to higher imports of groundfish fillets (up 5.9 million pounds), and frozen tuna other than albacore (up 2.7 million pounds), and to a lesser degree, an increase in the imports of canned salmon and frozen shrimp. The increase was partly offset by a drop in the imports of fresh and frozen salmon (down 0.8 million pounds) and canned tuna in brine (down 0.4 million pounds).

United States Foreign Trade in Edible Fishery Products, September 1959 with Comparisons						
Item	Quantity			Value		
	September 1959	1958	Year 1958	September 1959	1958	Year 1958
	(Millions of Lbs.)			(Millions of \$)		
Imports:						
Fish & shellfish:						
Fresh, frozen, & processed 1/	95.5	92.7	956.8	25.7	25.6	278.4
Exports:						
Fish & shellfish:						
Processed only 1/ (excluding fresh & frozen)	7.7	3.3	41.2	3.8	1.3	15.6

1/ Includes pastes, sauces, clam chowder and juice, and other specialties.

Compared with September 1958, the imports in September 1959 were up by 3.1 percent in quantity and 0.4 percent in value due to higher imports of canned salmon (up 2.1 million pounds) and fillets other than groundfish (up 1.6 million pounds).

United States exports of processed fish and shellfish in September 1959 were higher by 68.0 percent in quantity and 137.5 percent in value as compared with August 1959. Compared with the same month in 1958, the exports in September 1959 were higher by 129.1 percent in quantity and 192.3 percent in value due to sharply higher exports of relatively high-value

Maine herring landings through the end of August amounted to 83 million pounds--down 23 million pounds as compared with the same period in 1958. Landings of Pacific sardines through the end of October lagged nearly 103 million pounds behind the same period the previous year. California landings of tuna also decreased--down 33 million pounds. Total landings of Alaska salmon dropped from 239 million pounds in 1958 to 142 million pounds--the smallest catch since 1900.

canned salmon and a 112-percent increase in exports of California sardines.

* * * * *

GROUND FISH FILLET IMPORTS, OCTOBER 1959:

During October 1959, imports of groundfish and ocean perch, classified as fillets, into the United States totaled 11.5 million pounds. Canada was the leading country with 7.9 million pounds or 69 percent of the October 1959 total. Iceland was second with 3.2 million pounds. Imports from five other countries made up the remaining 376,000 pounds.

The sharp decline in October 1959 of imports of the above species classified as fillets was due to a recent United States Customs Court ruling which held that fish fillet blocks imported in bulk (15 pounds and over) are dutiable at one cent a pound under Tariff paragraph 720 (b) rather than at $1\frac{1}{2}$ cents or $2\frac{1}{2}$ cents a pound under Tariff paragraph 717 (b). This ruling became effective on September 15, 1959. Thus data on imports of groundfish fillets since that date are not comparable with previous data.

During the first ten months of 1959, imports of groundfish and ocean perch, classified as fillets, but not including fish blocks since September 15, into the United States totaled 137.6 million pounds. Canada, with 70.7 million pounds accounted for 51 percent of the 1959 ten-months total. Imports from Iceland (36.7 million pounds) represented 27 percent of the total, while Denmark followed with 14.0 million pounds or 10 percent, and Norway with 10.3 million pounds or 7 percent. Seven other countries made up the remaining 5.9 million pounds or 5 percent.

Note: See Chart 7 in this issue.

* * * * *

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1959 at the $12\frac{1}{2}$ -percent rate of duty is 52,372,574 pounds. Any imports in excess of the quota will be dutiable at 25 percent ad valorem.

Imports from January 1-November 28, 1959, amounted to 49,966,082 pounds, according to data compiled by the Bureau of Customs. The quota for 1958 of 44,693,874 pounds was reached on November 20, 1958.

* * * * *

U. S. IMPORTS AND EXPORTS OF SELECTED FISHERY PRODUCTS, JANUARY-SEPTEMBER 1959:

Summary: During the first nine months of 1959, the most important United States imports--tuna, shrimp, fish meal, and groundfish and ocean perch fillets--exceeded the quantities received during the same 1958 period. The most important exports--canned sardines, canned salmon, canned shrimp, canned squid, and fish oils--were above the quantities shipped during the same period of 1958.

Imports: GROUND FISH FILLETS AND BLOCKS: Imports of cod, haddock, hake, pollock, cusk, and ocean perch fillets and blocks for January-September 1959 were 0.4 percent above those of the like period of 1958. Cod fillets, up 16 percent; fillets of haddock, hake, etc., up 17 percent; blocks down 9 percent; and ocean perch fillets, down 25 percent. Canadian shipments of fillets and blocks were 19 percent below those of January-September 1958.

TUNA, FROZEN: During January-September 1959, imports of frozen albacore were down 22 percent from the like 1958 period; imports of other species of tuna were up 37 percent. Total imports of frozen tuna from Japan were 4 percent below the nine months period of 1958. Ecuadoran shipments of tuna were more than four times those for the like period of 1958. Shipments from Peru for the first 9 months of 1959 exceeded the previous record annual high. Included in the Peruvian and Ecuadoran figures were tuna caught and transhipped by United States flag vessels.

TUNA, CANNED IN BRINE: Imports during January-September 1959 were about the same as for the comparable period of 1958. A 21-percent decline in canned albacore shipments was offset

by an 8 percent rise in other canned tuna. The increase in imports of canned albacore in brine from countries other than Japan was due in part to large shipments from Spain.

SHRIMP: During January-September 1959, receipts were 33 percent above those of the like period of 1958. Most of the leading suppliers shipped shrimp in greater quantities. Shipments from Hong Kong were stopped until some acceptable method was devised to prevent shrimp from the Chinese mainland from being included in such shipments. Forty-nine countries are presently exporting shrimp to the United States.

CANNED SARDINES: Due to larger receipts from Portugal, Norway, and Denmark, imports of canned sardines in oil during January-September 1959 were up 16 percent over those of the like period of 1958. Imports of canned sardines not-in-oil continued at low levels.

SALMON: Lower shipments of canned salmon in the first 9 months of 1959 from Canada were nearly offset by greater shipments from Japan. Imports of fresh or frozen salmon, nearly all from Canada, were down 26 percent from the first 9 months of 1958.

FISH MEAL: Imports for January-September 1959 were 50 percent above those for the comparable period of 1958. Peru, which has been increasing its production of this product at a high rate in recent years, was the principal foreign supplier.

FISH SOLUBLES: With Denmark providing 76 percent of this product, imports for the first nine months of 1959 were 255 percent above those of the like period of 1958.

OTHER IMPORTS: During January-September 1959, the following products were received in substantially greater quantities than during the same period of 1959; tuna loins and discs, up 59 percent; canned lobsters, up 49 percent; fresh and frozen sea scallops, up 40 percent; canned crabmeat, up 37 percent; oysters (mostly canned), up 18 percent; and fresh or frozen frog legs, up 18 percent. Imports of fresh or frozen lobster

were up about 4 percent. The following products were received in lesser quantities: fresh and frozen flounder fillets, down 10 percent; and sperm whale oil, down 33 percent.

Exports: CANNED SARDINES, NOT IN OIL: Exports during the first nine months of 1959 were about 4 times those of the same period of 1958. The most important customer for this product continued to be the Philippines which took 33 percent of the total.

CANNED SALMON: During January-September 1959, the United Kingdom took nearly 5 times more canned salmon than during the comparable period of 1958. The Philippines accounted for most of balance. Total exports were up 336 percent.

SHRIMP: Canned exports January-September 1959 were up 46 percent over the first nine months of 1958, fresh and frozen exports were up 20 percent. The larger part of these products were shipped to Canada.

CANNED SQUID: During January-September 1959, exports were 47 percent above those of the like period of 1958.

FISH OILS: Totals for the first nine months of 1959 indicate that United States exports of fish oils have rebounded from the low-level of exports in 1958. The largest export market for fish oils was northern Europe. Canada, also a substantial market, took 77 percent less than during the like period of 1958. January-September 1959 exports were 113 percent more than in the same period of 1958.



Virginia

BIOLOGISTS ESTIMATE SPORT FISHERY CATCH IN CHESAPEAKE BAY:

Sport fishermen had to fish for 10 or 12 hours during 1959 to catch as many croaker as they did during one hour in 1956-57, but the fish they caught were generally of a larger size, according to

information collected by a biologist at the Virginia Fisheries Laboratory. This estimate of availability was obtained through interviews with sport fishermen and through log books voluntarily kept by them.



"Most fishermen realize that there has been a sharp drop in the numbers of croaker, and also changes in the abundance of other salt-water fishes," the biologist stated. "Catch record information obtained from log books and interviews make it possible to follow and compare these changes through a season and from one year to another. Those who have been keeping a log of their salt-water fishing trips should now send them to the Virginia Fisheries Laboratory for tabulation."

The records show that spot were caught in great numbers in 1959. Fishing for them was 2-3 times better in 1959 than during the 1958 season, though the fish were somewhat smaller in size. Good catches were made from July to the end of the season in lower Chesapeake Bay, whereas, in 1958, there was a late and short run of spot in the same waters.

Flounder or fluke catches during 1958 were running about 10 times higher than during 1956-57, and were three times higher in 1959 than in the 1956-57 seasons. Gray sea trout catches tell a story of continuing decline within Chesapeake Bay. Croaker, spot, gray sea trout, and fluke have been the mainstays of the sport catch for many years, but the swellfish or puffer joined this group during 1959. Previously reported only as an incidental portion of the sport catch, swellfish may rank ahead of gray sea trout, fluke, and croaker when the 1959 catch data is completely tallied. Perhaps more fishermen are becoming aware of the fine flavor and texture of swellfish and are taking them home instead of throwing them a-

way. Swellfish are marketed as "sea squab" and appear on the menus of some of the best restaurants.

LARGE-SCALE BLUE CRAB TAGGING PROGRAM UNDER WAY:

In the largest blue crab tagging program ever conducted in Chesapeake Bay, biologists of the Virginia Fisheries Laboratory released approximately 4,000 tagged crabs in Tidewater Virginia from May 15 to October 16, 1959.

Many of the tagged blue crabs have been caught by crab fishermen and close to 500 tags have been returned to the Laboratory. A reward of 25 cents is paid for each tag and the person returning the tag is told when and where the tag was placed on the crab. The biologist in charge of this program emphasizes the need for the prompt return of all tags by those who find them.

Of all the crabs released in the York River, only four were caught outside the River, while most of them stayed within ten miles of the spot where the tag was placed on them. Tagged crabs seem to move in no special direction during the summer months. Some males have been caught 6 or 7 times in the same pot and large numbers have been caught more than one time.

Crabs are being tagged and released in the York, Rappahannock, James, and Back Rivers tributary to the Bay in the hope that the biologists will be able to determine where the crabs caught in the winter dredge fishery originate, and at what time they move into the dredging area.

On October 16, 1959, biologists tagged and released 500 blue crabs in the Poquoson-Messick area. It will be of extreme interest to commercial crab fishermen as well as to biologists to know what proportion of the winter catch originates from each Virginia river. Therefore, all Chesapeake Bay commercial fishermen are requested to assist the Laboratory by noting the location of the catch and returning tags promptly.



Wholesale Prices, November 1959

The November 1959 wholesale price index (120.7 percent of the 1947-49 average) for edible fishery products (fresh, frozen, and canned) was down only 0.3 percent from the preceding month. However, compared with November 1958 the drop was sharper--5.9 percent.

Because of lower wholesale prices for frozen dressed halibut and salmon and Great Lakes whitefish, the drawn, dressed, and whole finfish subgroup price index declined 4.3 percent from October to November 1959. The drop was offset slightly by a small increase in the wholesale price for dressed large haddock at Boston and fresh Great Lakes yellow pike. Haddock landings in New England continued light. Compared to November 1958, prices in November 1959 were down 15.2 percent for fresh large haddock, 8.8 percent for frozen dressed halibut, 3.2 percent for large and medium red king salmon, and 16.7 percent for round whitefish at New York. Fresh Lake Superior dressed whitefish prices were unchanged and fresh Great Lakes yellow pike prices were up by about 40.0 percent. The net result was a drop of 5.0 percent in the index for this subgroup from November 1958 to November 1959.

Fresh processed fish and shellfish wholesale prices in mid-November 1959 were higher by 4.0 percent from the preceding month. Higher wholesale prices for small haddock fillets (up 5.9 percent), fresh shrimp at New York City (up 3.9 percent), and fresh shucked oysters (up 3.7 percent) raised the price index of this subgroup for the

second straight month. From November 1958 to November 1959, the fresh processed fish and shellfish subgroup index declined 3.4 percent. Lower prices for small haddock fillets (down 6.2 percent) and fresh shrimp (down 19.8 percent) more than compensated for a sharp increase of 16.6 percent in the prices for fresh oysters. Supplies of oysters on the East Coast were reported below normal.



Peeling shrimp in a breaded shrimp plant, Coral Gables, Fla.

From October to November 1959 the wholesale price index for frozen processed fish and shellfish was unchanged. The first increase in many months for frozen headless 26-30 count shrimp at Chicago (up 1.2 percent) equalized lower prices for frozen haddock fillets (down 2.3 percent) and fro-

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, November 1959 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices ¹ (\$)		Indexes (1947-49=100)			
			Nov. 1959	Oct. 1959	Nov. 1959	Oct. 1959	Sept. 1959	Nov. 1958
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					120.7	121.1	121.6	128.3
<u>Fresh & Frozen Fishery Products:</u>					133.4	134.0	134.8	147.4
Drawn, Dressed, or Whole Finfish:					147.2	153.8	159.9	155.0
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.13	.13	129.2	127.9	153.1	152.3
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.31	.32	95.9	98.5	101.1	105.2
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.75	.79	168.5	177.2	179.7	174.1
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.73	.75	179.7	185.9	179.7	179.7
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.63	1.00	126.4	202.3	146.7	151.7
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.70	.69	164.2	161.8	170.0	117.3
<u>Processed, Fresh (Fish & Shellfish):</u>					134.0	128.9	124.3	138.7
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.45	.43	153.1	144.6	117.4	163.3
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.65	.63	102.7	98.7	105.1	128.0
Oysters, shucked, standards	Norfolk	gal.	7.00	6.75	173.2	167.1	151.6	148.5
<u>Processed, Frozen (Fish & Shellfish):</u>					106.4	106.4	107.2	135.5
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.38	.38	98.8	99.5	98.8	108.6
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.32	.33	99.7	102.0	102.0	127.1
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.27	.27	108.8	108.8	108.8	120.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.63	.62	96.4	95.3	98.0	132.7
<u>Canned Fishery Products:</u>					103.4	103.4	103.4	101.1
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	24.50	24.50	127.8	127.8	127.8	112.2
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	10.80	10.80	77.9	77.9	77.9	86.2
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.50	7.50	88.1	88.1	88.1	96.9
Sardines, Maine, keyless oil, No. 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.75	8.75	93.1	93.1	93.1	87.5

¹/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

zen flounder fillets (down 0.7 percent). A sharp drop of 21.5 percent occurred in the wholesale price index for this subgroup from November 1958 to November 1959. Declines of 27.4 percent for frozen shrimp, 21.6 percent for haddock, 9.9 percent for ocean perch, and 9.1 percent for flounder fillets at Boston reflected better supplies of both domestic and imported products.

Canned fish prices in November 1959 were the same as in October and September. Stocks of all items in the subgroup, except tuna, were smaller as of the end of November 1959 than they were a year earlier. The pack of California

sardines in 1959 is forecast at only one-third or less of the 1958 pack. The Maine sardine pack as the 1959 season ended on November 30 was about 350,000 cases below the pack of 1958, which was only fair. Although there was a small amount of salmon packed in November 1959, it did little towards relieving the shortage of this canned product. The November 1959 canned fish price index was up 2.2 percent from November 1958. Higher prices for canned pink salmon (up 13.9 percent) and canned Maine sardines (up 6.4 percent) were offset by lower prices for canned California sardines (down 9.6 percent) and for California light meat tuna (down 9.1 percent).



FROM PIGFISH TO PORPOISE

Porpoises are dolphins because they are members of the dolphin family, the Delphinidae. Most of the technical books list the particular species found off southeastern United States as dolphins. But they are more commonly called porpoises because they have long been known by that name all along the Atlantic and Gulf coasts.

To many scientists in this country and to almost all European zoologists, porpoises are somewhat different animals from the ones we are acquainted with. The "true" porpoises are small (only 5 or 6 feet long), blunt-headed (instead of long-snouted), and have spade-shaped (instead of conical) teeth. Nevertheless, they too are usually included in the family Delphinidae, though some authorities have placed them in a family of their own.

One of these "true" porpoises is the most common member of the dolphin family in European coastal waters, holding the position there that our bottlenosed porpoise (or dolphin) holds along the coast of the United States. The Old World porpoise has been well known to fishermen in those waters for a long time. The name "porpoise" is hundreds of years old. It has been traced back through the Old French *porpeis* to the Latin *porcus pisces*, meaning pigfish or hogfish. It is interesting to note that even today porpoises (or dolphins) along the United States coast are sometimes called "herring hogs" by American fishermen, many of whom believe, quite mistakenly, that these aquatic mammals eat their weight in fish every 24 or 48 hours. (In point of fact they eat only about 5 percent of their weight a day.)

Fishermen and seafaring men who migrated to this country from Europe or England found a small cetacean abundant in these waters. It was similar to the porpoise they knew along the European coast--at least it had a similar appetite for fish--so they simply transferred the name to this New World "fishhog."

The net result is that we have two common names for each of the three species of small cetacean that are common in southeastern United States waters. The bottlenosed dolphin is our (common) porpoise. The longsnouted dolphin, which occurs farther offshore, is called the spotted porpoise. And the wide-ranging and attractively-marked common dolphin is known as the saddleback porpoise. (Mariner, December 1958.)



International

EUROPEAN FREE TRADE AREA

BRITISH-NORWEGIAN FISH TALKS BREAK DOWN:

The discussions in London in mid-October 1959 between British and Norwegian Ministers regarding trade in fish and fish products within a European Free Trade Area broke down. The discussions centered on a proposal by Norway that fishery products be treated as ordinary industrial goods within the area. This proposal has caused great concern to the British fishing industry, which fears that the British market would be flooded with foreign fishery products.

The Norwegians are seeking easier access to the British market for Norwegian fish products in return for the opening up of the Norwegian market for industrial goods under the new agreement.

Last summer when the proposals were submitted at the Stockholm conference, it was decided to leave the matter open for future discussion; hence the London meeting. At the time the British argued that while a reduction and elimination of the tariff on canned fish was possible there was a difference in the case of frozen fish.

The present British tariff on most fish products is 10 percent.

The distant-water trawler owners desired that any concessions made on tariffs should be matched by some ressurancance regarding the fisheries limits problem.

The Hull Fishing Vessel Owners' Association says: "Our direct interest in connection with this proposed agreement is that if it permits additional quantities

of fish or fish products to be exported from Norway to this country it will affect our own market.

"The proposal of the Free Trade Area Outer Seven would involve an immediate or a progressive abolition of the ten percent ad valorem duties on all imported wet fish. Until we know what fish it is proposed should be allowed in we are not in a position to comment." (The Fishing News, October 23, 1959.)

FIRST SOUTH AMERICAN ATLANTIC REGIONAL TECHNICAL CONFERENCE ON EXPLOITATION OF THE SEA

A regional International Fisheries Conference was held in Montevideo, Uruguay, September 28-30, 1959, under the auspices of the Food and Agriculture Organization. The conference was attended by delegations from Uruguay, Argentina, Brazil, and two representatives of FAO.

The meeting (termed as highly successful by the participating technicians) re-emphasized the importance of increased scientific and commercial exploitation of the South Atlantic. Necessity for unification of efforts and joint studies among the three countries was also highlighted. A Uruguayan participant in the conference stated that the four most important final recommendations adopted at the conference were the following:

- (1) To intensify studies and investigations about tuna fishing in order to obtain larger catches and to find out more about the migration habits of tuna;

- (2) To share the services of the shrimp fishing expert recently contracted by the Uruguayan Government with Argentina and Brazil, each country paying one year's salary of the technician;

International (Contd.):

(3) To intensify jointly the whale fishing industry and request from the FAO on a regional basis the services of an expert to advise the three countries;

(4) To decide on a joint commercial policy which would insure all three countries the highest possible earnings from their fishing industry.

The delegates were pleased with the progress made at the conference and both commercial and scientific interests expressed satisfaction that a closer regional understanding of the whole fisheries' complex had been achieved. A spokesman for the Uruguayan delegation stated that the findings of this conference will be used as a basis for a joint working plan which will eventually benefit each country by increased yields from the fishing industry and at the same time assure equal costs and profits and avoid repetition of scientific endeavors.

The need for additional technicians was repeatedly stressed and it was decided to make all future requests for FAO technicians on a regional basis, thus decreasing the cost of the expert's services to each country.

This conference appears to be indicative of recent intense interest displayed in Argentina, Brazil, and Uruguay to increase the fishing potential, an effort based to a great extent on the increasing meat shortage in those countries. (United States Embassy in Montevideo, October 5, 1959.)

FOOD AND AGRICULTURE ORGANIZATION

TENTH SESSION OF CONFERENCE:

The Tenth Session of the Conference of the Food and Agriculture Organization of the United Nations (FAO) convened at Rome, October 31, 1959.

The Conference of the FAO, which was established in 1945, is the chief legislative and policy-making organ of the Organization. Its membership comprises 76 countries. The chief aims of the FAO are to raise the levels of nutri-

tion and standards of living of the people under the jurisdiction of the Member Governments; secure improvements in the efficiency of production and distribution of all food and agricultural products; and to better the conditions of rural populations.

This session of the Conference considered, among other things, the world situation and outlook in respect to food and agriculture; food production in relation to population trends; economic position of farm populations; problems of agricultural development in underdeveloped countries and a proposed Freedom-from-Hunger Campaign. It also determined the budget for the next biennial period.

The Conference meets every two years in regular session and may meet in special session if necessary.

OCEANOGRAPHERS CALL FOR WORLD FISH CENSUS

How many fish are there in the sea, and where they are and how their numbers can be increased to feed the ever-increasing human population of the earth were practical questions in the background of one session of the International Oceanographic Congress at the United Nations in September 1959. But no one among the 500 experts from 38 countries knew the answers.

The great need for human nutrition is protein and fish is a rich source of proteins. If they could be raised as beef on fertile watery farms and ranges their numbers could be increased enormously and the fish themselves would grow to much larger size. But their growth and numbers are limited by the amount of food they can find. Increasing fish production requires an increase in the microscopic fish food called plankton on which fish life depends. A plankton census must precede a fish census.

Studies of plankton made by the Scottish Oceanographic Laboratory were reported to the Congress. These microscopic plants and animals occur in astronomical numbers in most sea water. More than 50,000 samples of plankton were analyzed annually and each was separated into about 100 different species to discover where each is most plentiful. A plankton map of the North Sea and the nearby parts of the Atlantic and Arctic oceans will soon be published as a guide to the fish-feeding grounds.

Extension of such a map to the entire ocean and to a world fish census is being discussed as a major project in the near future for one of the international organizations such as UNESCO or the International Council of Scientific Unions. Meanwhile there have been some successful transplantations of young fish over long oceanic distances to better feeding grounds. This was done for the European plaice with a large increase in the catch at the new location. The striped sea bass has been successfully transferred from the Atlantic to the Pacific. But every attempt to grow Atlantic shore oysters in the Pacific has failed. Much research will be needed on sea plants and small animals before any effect can be expected on the catch of edible fish.

A professor of Cambridge University in England reported to the Congress on the fantastic forms that have developed among fishes of the great depths of the ocean—fish with mouths that extend half the length of their bodies, stomachs that can be extended to permit a fish to devour

International (Contd.):

a fish larger than itself, and luminous bait that some fish carry before them on long antennae-like organs to attract their food. The reason for the existence of these queer fish is unknown but the professor claimed that the absolutely unchanging environment in the dark depths of the sea would permit mutation to run wild over millions of years. In the deep trenches that sink a mile or more below the great plains of the sea bottom, the odd species that develop in one trench may be quite different from those in a neighboring trench.

WHALING

RUSSIA ASKS NORWAY AND NETHERLANDS TO RECONSIDER WITHDRAWAL FROM CONVENTION:

A Soviet Foreign Ministry Note (No. 79/osa) of October 12, 1959, forwarded to the United States Government for deposit identical Soviet notes of October 3, 1959, to Great Britain, the Netherlands, Norway, and Japan. These notes concern the Soviet attitude toward the withdrawal of Norway and the Netherlands from the International Whaling Convention of 1946. A translation of the note to Great Britain follows:

"The Ministry of Foreign Affairs of the Union of Soviet Socialist Republics presents its compliments to the Embassy of Great Britain and has the honor to state the following:

"The Government of the Union SSR has examined questions connected with the whaling industry in Antarctica and the situation created as a result of the withdrawal of Norway and Holland from the International Convention on Regulation of the Whaling Industry of 1946.

"As is known, 20 whaling flotillas have been working in the Antarctic during past years, among this number nine Norwegian flotillas and one Dutch flotilla, which obtain approximately half of the whaling quota established in the Convention. It is not by chance, therefore, that Article X of the Convention states that it comes into force on condition of the obligatory participation of Norway and Holland. Under these conditions the withdrawal of Norway and Holland from the Convention signifies the disruption of the cooperation, which has developed successfully for more than 10 years in the field of protection of the reserves of whales, and the beginning of unregulated exploitation.

"The question arises whether or not everything has been done to avoid those undesirable consequences for the supply of whales in the Antarctic which will take place as a result of the situation which has developed.

"In analyzing the proceedings of the London Conference of five countries which took place at the end of June of this year, it is necessary to acknowledge that efforts were made on the part of a number of countries, in particular on the part of Norway, to reach an agreement acceptable to all within the framework of the Convention on the basis of known recommendations accepted by the same countries in the conference in London in November 1958. As the result of this conference and the conferences which preceded it, some approximation of points of view occurred which, however, did not result in final agreement with respect to the distribution of the general quota for whaling among the main countries which carry on whaling in the Antarctic.

"In this connection, the Government of the Union SSR cannot but express its concern, since scientific data show that the state of the reserves of whales in the Antarctic continues to remain acute, and the beginning of unregulated whaling with the present season will inevitably lead to their rapid reduction to a level at which whaling will become entirely unprofitable for many countries. Under these circumstances it will in the future be still more difficult to reach agreement on protection of reserves of whales in the Antarctic and on rational conduct of whaling.

"The Government of the Union SSR considers that all possibilities have not yet been exhausted for reaching agreement on the basis of the aforementioned 1958 London recommendations. The Soviet Union for its part is ready to cooperate fully in strengthening international collaboration in the matter of protection of reserves of whales and the rational conduct of whaling on the basis of the 1946 Convention.

"In connection with this the Government of the Union SSR hopes that the Governments of Norway and Holland will find it possible to reconsider their

International (Contd.):

decision to leave the Convention and will devote efforts to reaching agreement between the countries which conduct whaling in the Antarctic. Such a step on the part of Norway and Holland would without doubt be welcomed by all participants of the Convention.

"At the same time, the Government of the Union SSR is compelled to state that, if the force and authority of the Convention, which have been weakened by the withdrawal from it of Norway and Holland, are not restored by the beginning of the whaling season in the Antarctic, the Soviet Union, under these new conditions, will be guided by the Convention in the conduct of whaling in the Antarctic, with the position and practice of other countries taken into account and having in view the interests of the Soviet whaling industry."



Angola

FISH MEAL PLANT INSTALLED
BY NORWEGIAN FIRM:

A Norwegian firm has equipped an entire fish-meal plant at Porto Alexandre in Angola. The capacity of the plant is 150 metric tons a day, according to the journal Norway Exports. The contract price was £80,000 (US\$224,000). The Norwegian firm installed the Angolan plant and is providing technical assistance for six months after the plant starts operating.

The firm's connection with the Angolan fish-meal industry started in 1956 when some meal from that area, sun-dried by many small plants, was rejected by the German market. (The South African Shipping News and Fishing Industry Review, September 1959.)



Argentina

IMPORT SURCHARGES REMOVED
ON LARGE FISHING VESSELS:

The Argentine Government has issued an executive decree (No. 13,287 of October 22, 1959, published in the Boletín Oficial of November 3, 1959) which eliminates surcharges and prior deposits on the importation of deep-sea fishing vessels. The free-entry privilege applies to vessels which are imported and registered in the country within a period of 360 days from the date of the decree.

The decree establishes that three Government departments (the Dirección Nacional de la Marina Mercante y Puertos, the Dirección General de Pesca, and the Prefectura Nacional Marítima) must certify in advance that each proposed importation is suitable as a deep-sea fishing vessel. Following this procedure, the Secretariat of Industry and Mining and the Secretariat of the Navy must prepare in each case a document for submission to Customs certifying that the proposed importation is eligible for free entry under the decree. The free entry will not be applicable to types of vessels which can be produced in "technically adequate conditions" by local industry. The two Secretariats will decide whether the proposed importation can be satisfactorily produced in the country.

The decree answers repeated complaints by spokesmen of the Argentine fishing industry that development of the industry has been held up for years by restrictions on importation of vessels, among other factors. Most of the present Argentine deep-sea fishing fleet (some 26 vessels) is antiquated and ill-equipped. Although credit is very tight in the Argentine market at present, it is believed that some of the fishing companies will be able to take advantage of this decree. The decree does not require the vessels to be imported by new.



Australia

CANNERIES SET TUNA PRICE FOR 1959/60 SEASON:

The tuna canneries owned by a Sydney, Australia, firm and located in Eden and Narooma, New South Wales, will pay 6d. per pound (about 5.6 U. S. cents a pound or US\$112 a short ton) for raw tuna delivered to the canneries in the 1959/60 season. The canneries will take a minimum of 1,200 tons. Additional purchases will depend on market conditions as the season progresses.

Good signs of bluefin tuna were reported outside the 100-fathom line southeast of Lakes Entrance, Victoria, the latter part of July and early in August. These tuna were mainly in the 40-60 pound size group, the Australian Fisheries Newsletter reported in its September 1959 issue.

EXPORTS OF SPINY LOBSTERS CONTINUE TO RISE:

During the year ending June 30, 1959, Australian spiny lobster exports (practically all went to the United States) rose 14 percent in quantity. The value (about US\$7 million) was over five times the value of spiny lobster exports to the United States ten years ago.

The Australian Ministry of Primary Industry in releasing these figures said that the number of men and vessels engaged had increased in all spiny lobster fishing areas, but that the fishermen had been forced to operate over larger and larger areas and in many cases were fishing out to the 60-fathom line, the United States Embassy in Canberra reported on October 16, 1959.

LAND-BASED WHALING SEASON ENDS:

Two of the five Australian coastal whaling stations obtained their 1959 permitted quota in August and ceased whaling for this season.

Byron Bay commenced on June 3 and finished on July 28, having taken

150 whales in 56 days, compared with 120 whales last year in 57 days.

Moreton Island, which commenced the season on June 8, finished on August 9, having taken 660 whales in 63 days, compared with 600 whales last year in 65 days.

At Norfolk Island, where whaling commenced on June 12, 87 whales had been taken to August 8.

At the same date, Cheynes Beach, which commenced on May 18, had taken 148 humpbacks and 6 blue whales.

Also as at August 8, Carnarvon, which commenced on May 17, had taken 332 humpbacks, 6 blues and 1 fin whale. (The Fisheries News Letter, Sept. 1959.)

NEW SPECIES OF SHRIMP FOUND IN DEEP WATER BY EXPLORATORY VESSEL:

A species of shrimp not previously known in Australian waters was caught by the Government-chartered survey vessel Challenge in the Australian Broken Bay-Norah Head area in 145-155 fathoms. The shrimp survey is being conducted by the Australian Fisheries Division.

The species was later identified by a marine biologist as "most certainly" of the genus Hymenopenaeus. He said that if it proved to be a new species, it would be named after the Challenge. The shrimp has an average body length of 7½ inches, bright pink body, and tailfin marked with deep red. A species of Hymenopenaeus is trawled commercially in the United States where it is known as royal-red shrimp (Hymenopenaeus robustus).

Three other new species of shrimp commercially unimportant, were also found in June and July 1959.

Concentrations of Parapenaeus australiensis were found in Stockton Bight mixed with king shrimp. P. australiensis is orange-red with a red tailfin, grows to about 6½ inches, and is very tasty. It may still be found in commercial quantities. P. australiensis is nearly always found with king shrimp in the

Australia (Contd.):

proportion of about 2 to 3. Its optimal habitat seems to be the range between 45 and 65 fathoms, and it does not occur further inshore. The larvae have been found in plankton catches indicating that this shrimp spawns much earlier than all Australian commercial species.

The red shrimp (*Aristaeomorpha foliacea*) was taken by the Challenge in the Broken Bay-Norah Head area. This shrimp, which was a record for New South Wales, was found 45 years ago by the Commonwealth research trawler Endeavour in the vicinity of Gabo Island. This species seems to be common below 110 fathoms for it has been captured on nearly all tows on the Continental Slope. It is not certain, however, whether it does not school well above the bottom, in which case it may have been encountered on the net's way up. Further work is necessary to establish whether it can be taken in commercial quantity. In July, the Challenge worked first in the Norah Head-Newcastle area, then north to Port Stephens and back to Sidney.

A run of good weather enabled further deep-water work to be carried out off Norah Head-Newcastle. Several royal-red and one red shrimp were taken, but there was no sign of shrimp in quantity. The shelf slope was steeper and rougher in this area.

King and red shrimp were caught off Newcastle in 30 to 50 fathoms, but commercial vessels had ceased fishing for lack of sufficient quantities, although large catches had been obtained a month earlier.

Leaving Sydney, the Challenge worked off Botany Bay and then Jervis Bay. There the water temperature was 20° C. lower than a month earlier and the number of shrimp taken was even less.

A considerable time was spent looking for suitable bottom in depths over 80 fathoms from east of Ulladulla to Jervis Bay. The bottom in this area seemed to be all very rough and the slope from 90 fathoms was extremely

steep and cut by deep gutters. None of the area covered was workable.

The Challenge then worked in Shoalhaven Bight, and off Lake Illawarra and Cronulla, before returning to Sydney.

Small catches of school shrimp were made off Crookhaven River entrance. Several commercial vessels were working in this area and catches had been better several days previously.

Generally speaking the catches showed that there was a poorer indication of king shrimp in the deeper water than there had been about a month earlier. (Australian Fisheries Newsletter, September 1959.)

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NEW TYPE SPINY LOBSTER FISHING VESSEL:

An unusual type spiny lobster fishing vessel, under construction at Hamilton Hill, Australia, is expected to do the work of two conventional vessels. The vessel is being built by the captain-owner for his own use.

The new vessel will be steered by two hemispherical metal shells around each propeller. By closing the shells the boat will go astern.

Instead of pulling spiny lobster pots up over the side, specially designed gear will automatically pull the pots up over the sloping stern.

Hexagonal floats and thin steel cables will be used. A winch, recessed to take the six-sided floats, will wrap the cable neatly around the float as it is revolved.

The bases of the pots can be quickly detached, the spiny lobsters removed, and freshly-baited bases clipped on.

A 300-case freezing chamber will be added later.

The double-skinned, steel, 41-foot boat, with twin Diesel engines, was designed jointly by a Fremantle marine designer and the owner.

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Australia (Contd.):

**SNAPPER CATCHES IMPROVED
BY USING TRAPS:**

Use of traps instead of line fishing for snapper has been producing heavy catches in Western Australia from the Shark Bay grounds.

The Fremantle Fisherman's Co-operative Manager said at the end of July 1959 that Co-operative boats had already caught almost 500,000 pounds of snapper.

Among the big catches reported were 67,000 pounds taken in 11 days' fishing by the new aluminium alloy vessel Lady of Fatima, 54,000 pounds by Miss Phoenix, 26,000 pounds in each of three trips by Kingfisher, and 26,000 pounds by Proton.

In mid-August, the snapper was being sold direct from the boats to merchants at an average price of about 18 U. S. cents a pound. (Australian Fisheries Newsletter, September 1959.)

**Belgium****MINIMUM EX-VESSEL FISH
PRICES ESTABLISHED:**

The Belgium Ministry of Agriculture has approved the 1959/60 minimum prices for fish sold at wholesale markets on the Belgian coast. The prices were fixed by the Rederscentrale (Fishing Companies Association) of Ostend at 2.4-4.5 U. S. cents a pound according to the size and quality of the various species.

These minimum prices for fish went into effect on September 28, 1959. The Rederscentrale is working out a minimum price system for shrimp and sprat.

The following species are sold at a minimum price of 5.00 Belgian francs per kilo (about 4.5 U. S. cents a pound): cod (over 60 cm. or 23 inches); haddock (over 35 cm. or 14 inches); coalfish (over 60 cm.); pollock (over 60 cm.); ling (over 60 cm.); whiting, large (over

30 cm. or 12 inches); gurnard, large (over 35 cm.); sea bream, large (over 35 cm.); dogfish, large (over 60 cm.); plaice (over 30 cm.); dab (over 30 cm.); and ray, large (over 50 cm. or 20 inches width of wings).

The following species are sold at a minimum price of 4.00 Belgian francs per kilo (about 3.6 U. S. cents a pound): coalfish, small (from 30 to 60 cm. or 12-24 inches); pollock, small (from 30 to 60 cm.); ling, small (from 30 to 60 cm.); whiting (from 25 to 30 cm. or 10-12 inches); brill, small (over 50 cm.); conger eel; gurnard, small (less than 35 cm.); sea bream, small (less than 35 cm.); catfish; flatfish, small (from 25 to 30 cm.); dab, small (from 25 to 30 cm.); plaice (from 25 to 30 cm.); witch (over 28 cm. or 11 inches); ray (from 35 to 50 cm.); grey gurnard (over 28 cm.); latchet (over 28 cm.); mackerel; and herring.

The following species are sold at a minimum price of 3.00 Belgian francs per kilo (about 2.7 U. S. cents a pound): houndfish, small (from 50 to 60 cm.); dogfish, small (from 50 to 60 cm.); sand dogfish (over 50 cm.); flounder (over 30 cm.); cat ray (from 30 to 35 cm.); small herring; and pilchards.

The following species are sold at a minimum price of 2.60 francs per kilo (about 2.4 U. S. cents a pound): small mackerel and herring for canneries.

Whenever the wholesale prices offered at the Belgian coast are lower than the fixed minimum prices, the fish will be purchased at those minimum prices by the Government Purchase Program of the Ministry of Agriculture, and sold to the fish meal industries. (United States Consul in Antwerp, October 7, 1959.)

**Canada****CONSUMPTION OF FISHERY
PRODUCTS IN 1956 AND 1957:**

In terms of edible weight the consumption of fishery products in Canada in 1957 amounted to 13.4 pounds per capita--unchanged from 1956. In both years, Ca-

Canada (Contd.):

nadians consumed 7.2 pounds of fresh and frozen fish and shellfish, 4.5 pounds canned fish and shellfish, and 1.7 pounds of smoked, salted, and pickled fish.

In the United States per capita consumption of fishery products in 1957 amounted to 5.6 pounds of fresh and frozen fish and shellfish, 3.9 pounds of canned fish and shellfish, and 0.6 pounds of smoked, salted, and cured fishery products--or a total of 10.1 pounds, edible weight.

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NEWFOUNDLAND FISHERY TRENDS, 1958-59:

Stormy weather, a shortage of bait, and a scarcity of cod on Newfoundland's inshore fishing grounds in 1958 are given as the causes of the worst cod fishery in 20 years. Consequently, most fishermen were barely able to qualify for the minimum unemployment insurance (C\$9.00 per week for 15 weeks). Due to the scarcity of cod, exporters of salted fish were unable to supply their markets before the year's end.

There were few developments of any consequence in the fishing industry which would cause optimism. Efforts made to obtain financial aid from the Canadian Government for fishermen were unsuccessful. There was some legislation which may be helpful in the future, but afforded no immediate relief, except for modest employment in some areas. These included the construction of 20 fishing stages, the introduction of four portable bait lockers which are said to have proven successful, and the purchase of two refrigerator trucks to transport bait from freezing plants to holding lockers.

Production of frozen fillets in 1958 increased over 1957 for all species except cod. Had it not been for the large increase in production of frozen fillets the fisheries most likely would have been a complete failure.

The outset of the 1959 fishery had prospects of being a repetition of the previous year due to adverse weather

conditions and heavy ice. However, after a late start landings began to pick up. It is now considered that the 1959 fishery may be the best in the past five years due to an excellent cod trap fishery during July and August. The industry as a whole should enjoy a healthy and profitable year in 1959, and should give encouragement to more fishermen to return to the sea.

As in 1958, there were few developments offering encouragement to the industry or the fishermen as a whole. Probably the most noteworthy was the purchase of a freezing plant at Fortune, which was closed for nearly three years, by a Chicago, Ill., firm. The reopening of this plant means the re-employment of from 200-250 persons, when operating at full capacity.

The Newfoundland Associated Fish Exporters' Ltd. (NAFEL) exclusive license to export salted cod expired on July 31, 1959. While there were fears in some circles that if order was not retained in the marketing of salt fish, havoc in the industry might occur, this apparently has not proven to be the case so far. Since NAFEL lost its charter, it has continued to function as an exporter of salted fish. According to official sources there has been little change in the organizational pattern of NAFEL, and the majority of fish producers are continuing to use its services.

With a view toward improving the quality of processed fish, which would benefit the industry, the Canadian Government passed the Meat and Canned Foods Act and the Fish Inspection Act, both of which became effective in Newfoundland on July 1, 1959.

In July 1959 the Canadian Government announced, without giving any advance notice, that it was relinquishing the administration of the fish-culling regulations in Newfoundland. Subsequent to this announcement the Provincial Government stated that it was not in a position at present to take over this work due to lack of trained personnel and funds. This state of affairs has caused much concern to the fish trades group who have declared that without culling regulations the fishing industry has been

Canada (Contd.):

placed in a precarious state. Many are afraid that some producers may include inferior quality with choice fish destined for "high class" overseas markets, thus causing a loss of the market. It is believed that when the Newfoundland Provincial House of Assembly meets again it will be pressured by the Fish Trades Association and other interested groups into taking some action to rectify the present situation.

Landings, 1957-58: Total fish landings for the year 1958 amounted to 464 million pounds, valued at C\$11,272,000, as compared with 576 million pounds, valued at C\$13,639,573 in 1957, a decrease of 19.4 percent in quantity and 17.4 percent in value. In 1958, as in 1957, cod, haddock, caplin, and squid were responsible for a further decline in total landings. Landings of cod totaled 300 million pounds in 1958, as compared with 401.6 million pounds in 1957, a decrease of 25.4 percent. Landings of haddock declined by 30.1 percent with 30.8 million pounds in 1958, as compared with 44 million pounds in 1957. Caplin (used for bait) dropped

17.0 percent as they failed to appear in the usual large quantities, and squid, another form of bait, registered the largest decrease in total landings. Only 1.6 million pounds of this favored bait were landed, as compared with 5.8 million pounds in 1957, a drop of 72.7 percent. The only noticeable increases registered among the major species were for ocean perch, sea dabs, and grey sole. Landings of ocean perch were up 58.2 percent, 25.4 million pounds being taken, as compared with 16.1 million pounds in 1957. Landings of sea dabs and grey sole increased by 17.4 percent over 1957. Herring, used primarily as bait, also registered an increase in total landings of 30.8 percent over the 1957 catch. Landings of salmon, most valuable spe-

cies on a per pound basis, continued to increase. 2.2 million pounds were landed in 1958, as compared with 2.0 million pounds in 1957, an increase of 9.6 percent.

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PRODUCTION, IMPORTS,
EXPORTS OF MARINE OILS:

If the Canadian fish landings late in 1959 are at all satisfactory, the production of marine oils for 1959 will exceed the 5.7 million Imperial gallons produced in 1958. Production of both cod and British Columbia herring oil was higher through July 1959 as compared with January-July 1958.

In 1958, as compared with 1956 and 1957, increasing amounts of marine oil were used in the manufacture of margarine, and decreasing amounts in the manufacture of shortening. In 1959 the amount of marine oil used in those products was much lower than in 1958, being replaced largely by cheaper vegetable oils and lard. During January-August 1959, only 11.7 million pounds of marine oils were used in margarine and shortening as compared with the use of 24.8 million pounds during the comparable period of 1958.

In 1956 and 1957 Canada was a net exporter of marine oils and in 1958 imports and exports about balanced. In 1959, as a result of the large over-all supply of fats and oils, Canada was a heavy exporter of marine oils. During the first eight months 1959, as compared with the comparable period in 1958, larger supplies of cod-liver and herring oils moved to the United States and the United Kingdom, respectively.

Imports in 1959 were much lower than in 1958, the largest decrease being in fish and marine animal oils from the United States. (See tables 1, 2, and 3 on following page.)

Table 1 - Newfoundland's Offshore
1958 Fishing Fleet and Landings,

Vessel Type	Number	Total Landings (Round Weight)
		1,000 Lbs.
Trawlers	17	72,591
Draggers	8	17,832
Danish seiners	6	665
Long liners	23	6,040

Table 1 - Canada's Production of Marine Oils, 1956-58 and January-July 1958-59

Products	January-July		Year 1958	Year 1957	Year 1956
	1959	1958			
	(Imperial Gallons)				
Atlantic:					
Cod oil	448,467	297,877	630,540	823,323	965,198
Herring oil	1/	1/	1/	107,900	148,271
Other (seal, etc.)	2,265,056	2,557,566	2,983,502	712,343	465,436
Total	713,523	955,443	1,569,102	1,644,066	1,518,905
British Columbia:					
Herring oil	4,127,761	2,180,510	4,127,761	2,180,510	4,725,903
Grand Total	4,841,284	3,135,953	5,696,863	3,824,576	6,244,808
1/Not available.					
2/Includes herring oil.					

Table 2 - Canada's Exports of Marine Oils, 1956-58 and January-August 1958-59

Products	January-May		Year	Year	Year
	1959	1958	1958	1957	1956
	(Imperial Gallons).				
Cod Liver Oil:					
Total Exports	449,482	321,106	540,867	601,550	655,020
To United States	390,381	257,599	443,893	571,585	655,020
Herring Oil:					
Total Exports	1,725,893	-	739,236	20,100	1,374,569
To United States:	56,196	-	277,733	20,100	133,234
Whale Oil:					
Total Exports	109,546	48,876	356,715	213,102	349,150
To United States	53,724	43,167	87,290	193,312	257,776
Other Fish Oil:					
Total Exports	423	1,219	5,078	33,417	13,379
To United States	420	1,217	5,076	33,410	12,008
Total Exports	2,385,344	371,201	1,641,896	868,169	2,392,118
Total to United States	501,224	301,983	813,992	818,407	1,064,038

Table 3 - Canada's Imports of Marine Oils, 1956-58 and January-May 1958-59

Products	January-May		Year	Year	Year
	1959	1958	1958	1957	1956
	(Imperial Gallons ¹)				
Cod Liver Oil:					
Total Imports	80,328	76,674	231,081	122,031	134,117
From United States	-	11	11	537	396
Whale and Sperm Oil:					
Total Imports	13,391	6,912	21,225	24,497	28,889
From United States	11,703	3,898	10,199	1,118	-
Other Fish and Marine					
Animal Oils:					
Total Imports	109,312	982,341	1,409,910	301,874	328,427
From United States	107,419	966,937	1,375,162	280,563	300,160
Total Imports all Marine					
Oils	203,031	1,065,927	1,662,216	448,402	491,433
Total from United States . .	119,122	970,846	1,385,372	282,218	300,556

1/One Imperial gallon is equal to 1.2009 U. S. gallons.

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Canada (Contd.):

REFRIGERATION STANDARDS FOR FRESH AND FROZEN FISHERY PRODUCTS AMENDED:

Regulations on refrigeration under section 5.4.9 of Canada's Specification 32-GP-141A--the voluntary standard for fresh and frozen fishery products are being amended. The fishing industry was not unanimous on this change, but a majority favored it. The amendment will read:

"5.4.9 Frozen fish or processed fish shall be continuously maintained at the lowest practical temperature during frozen storage. A temperature not higher than -10°F . is recommended. Delivery of frozen fish, acceptable under this Specification, if made by railway transport, shall be made under maximum icing procedures which are as follows for the winter and summer seasons:

"April 1 to November 30 inclusive: Initial-ly ice to capacity with crushed ice and 30 percent salt about 24 hours before loading commences, and re-ice to capacity after loading completed. Endorse billing: - 'Re-ice in transit, to capacity, at all regular icing stations with crushed ice and 30 percent salt.'

"December 1 to March 31 inclusive: Initial-ly ice to capacity with crushed ice and 30 percent salt about 24 hours before loading commences, and re-ice to capacity after loading completed. Endorse billing: - 'Re-ice in transit, to capacity, at all regular icing stations with crushed ice and 30 percent salt, only when car requires total 1,500 pounds or more ice.'

"In the railway transport of fresh fish acceptable under this Specification, maximum icing procedures of the rail cars will be observed with the mixture of crushed ice and 10 percent salt in summer and crushed ice alone in winter.

"Delivery of frozen or fresh fish, acceptable under this Specification, if made other than by railway transport, shall be made by a carrier using good commercially practical refrigeration."

The change from the previous wording of the Specification consists of the addition of the specific instructions for re-icing for railway shipments. Many shippers now use these same icing instructions but, once the Specification has been officially amended, these instructions will be mandatory for moving products inspected under this Specification by rail.

* * * * *

SMALL-TYPE GILL-NET BOAT BUILT FOR FRASER RIVER SALMON FISHERY:

The forerunner of a possible trend in smaller size gill-net boats for the Fraser

River salmon fishery was viewed recently. For the past few years the move has been to larger gill-netters of about 35 feet in length; however, this isn't the case with the *Agnes T*, built by a Steveston, British Columbia, shipyard.

The *Agnes T* is 30 feet long with a beam of $8\frac{1}{2}$ -feet, has the popular new style wheelhouse which provides more comfort and visibility, and boasts automatic steering equipment with power drum and steering controls at the stern. The vessel is powered by a 140-hp. gas engine. (*Canadian Trade News*, September 1959.)



Colombia

NEW FISH FREEZING PLANT INSTALLED:

A new fish-freezing plant has been installed in the Colombia Pacific Coast port of Buenaventura. The plant was expected to begin operations in November or December 1959.

The new freezing plant has a storage capacity of 500,000 pounds and a freezing capacity of 30 metric tons, plus space for drying 30 tons of cod. The plant cost about US\$191,000 (at rate of exchange 7.84 pesos equal US\$1), employs 300 persons, and is supplied by 50 fishing vessels with a complement of 250 fishermen.



Cuba

JOINT CUBAN-JAPANESE TUNA PROCESSING FIRM DENIED NEW INDUSTRY STATUS:

A Cuban Ministry of Treasury resolution published in *Official Gazette* No. 195 of October 15, 1959, denied "new industry" benefits to the Cuban firm *Pesqueras Internacionales, S. A.* (International Fisheries Incorporated). The firm originally requested these benefits on July 5, 1957. The Treasury resolution admitted that some of the firm's seafood products, such as sausages and hams manufactured from fish and shellfish, were considered new to Cuba as far as presentation and preparation were con-

Cuba (Contd.):

cerned. However, they were deemed not to be too dissimilar from products already manufactured by various firms in Cuba which have been packing fish and shellfish items over many years.

As far as is known, no production of hams or sausages by the referenced firm for Cuban consumption ever took place. Those tuna loins which were manufactured from the tuna catch of the Japanese tuna clipper Sumiyoshi Maru, were exported to the United States for final processing. The Treasury ruling is not expected to affect seriously the operations of the Cuban-Japanese firm, the United States Embassy in Habana reported on November 12, 1959.



Denmark

FISHERIES TRADE FAIR
HELD IN COPENHAGEN:

The Third International Fisheries Trade Fair was held in Copenhagen from September 25-October 4, 1959. The number of visitors totaled 70,000, or about 10,000 more than the previous fair. There were many visitors from European and overseas countries. Sales effected at the fair were reported to be in excess of 200 million kroner (US\$29 million).

Exhibitors from several European countries as well as from Japan and the United States were represented. The American exhibitors included one Diesel engine firm of Peoria, Ill., a fork lift truck firm from Portland, Ore., a New Orleans, La., firm with shrimp processing machinery, and an outboard motor Company of West Bend, Wis.

The Fourth International Fisheries Trade Fair in Copenhagen is planned for 1962. (United States Embassy in Copenhagen, October 14, 1959.)

Note: Also see Commercial Fisheries Review, Sept. 1959, p. 51.



Egypt

FISHERIES TRENDS, OCTOBER 1959:

In February 1959, the Egyptian Government announced the establishment of a High Council for Fisheries to be headed by the Vice President, and to include representatives from the Ministries of Agriculture, Industry, Supply, Economy, and Coast Guard. The move was an attempt to coordinate the policies of these various ministries, each of which had some interest in fishery problems. It was expected that the Council would coordinate and develop plans for research and expansion of the Egyptian fishing industry.



The importance of fish in Ancient Egypt is shown by this model of the Nile God (Hapi) on which are fish, water fowl, and lotus flowers. Statue is in Agricultural Museum, Cairo. Original statue dates back to about 2,000 B. C.

The Government took a number of positive steps in 1959 to implement plans for the development of the fishing industry. It appears to have concentrated its efforts on improving the production of the inland-water fisheries.

Egypt (Contd.):

It has reopened the channels leading from Lakes Edkou and Monzalaha to the sea. The decreased water salinity resulting from this action is expected to increase the catch in those two lakes, which provided about 35 percent of the total fishery landings in 1958.

Another step taken by the Government has been to grant, through the Agricultural Bank, loans to fishermen's cooperatives. These loans are expected to reach £E195,000 (US\$560,000) in 1959, and will probably be increased in 1960. By enabling the fishermen to obtain easier credit with which to buy boats, nets, and maintain their equipment, it is hoped catches will increase.

Further, the Government has continued to try to improve internal distributing facilities. During the past year it added a number of refrigerator trucks to transport fresh fish from Suez to Cairo.

During a part of 1958, four Yugoslav fishing vessels, under contract to the Egyptian Government, carried out exploratory and research work in Egyptian waters. Two of the vessels operated in the Red Sea and two in the Mediterranean. The latter finished their work early in 1959 while it is understood the former are continuing their operations. According to an official of the Hydrobiological Institute, the results have not yet been fully studied, although the prospects for significant catches of tuna in the Mediterranean area west of Alexandria to the Libyan border were reported as discouraging.

In March 1959, the Japanese fishing research vessel *Shoyo Maru* arrived in Alexandria. The vessel did work in the Mediterranean and Red Seas, with the principal object of discovering whether or not commercial catches of tuna might be found. Again, the results were disappointing in the Mediterranean, and only slightly less so in the Red Sea. It is believed that the failure of the Yugoslav and the Japanese vessels to find significant quantities of tuna has considerably dampened earlier hopes for

the establishment of a tuna fishing and processing industry.

Meanwhile, efforts appear to be concentrated on research being carried out, with Food and Agriculture Organization assistance, in the inland lakes. It is understood that the results of this research are much more promising.

There have been no significant developments of changes in the size or composition of Egypt's fishing fleet during 1959. The present fleet consists of approximately 485 small motor fishing vessels and probably about 1,500 small sailing vessels (excluding the inland lake boats). The total absence of larger trawlers, both for shrimp and fish, continues to be one of the principal factors limiting possibilities for significantly increasing the production of Egypt's ocean fishing industry.

In 1958 Egypt imported twice as much fish and fish products as she exported--imports £E389,316 (US\$1,118,000) and exports £E186,161 (US\$535,000). In previous years Egypt imported much larger quantities of fish and fish products (£E1,068,570 or about US\$3,069,000 in 1957). Egyptian exports, principally shrimp, have increased considerably, up from £E92,719 in 1957. Egypt is expected to continue to restrict imports and encourage exports of fishery products.

Aside from the Yugoslav and Japanese research assistance mentioned, the only countries known to have an active interest in the development of the Egyptian fishing industry, and these on a very small scale, are Greece and Japan. Greece has a small interest in the sponge fishing industry, and several private Greek interests in the past have expressed a willingness to participate in establishing fishing operations. Japan has shown an interest in assisting in the establishment of economically-feasible fishing operations and processing plants. Except for the possible establishment of a sardine canning factory which would use Japanese equipment and technical assistance, it is believed no other foreign investment plans exist. Whether foreign assistance remains

Egypt (Contd.):

confined to research, the provision of processing equipment and technical advice will depend to a large extent on the Egyptian Government's general policy regarding private foreign investment.

In addition to the sardine canning factory, it is believed the Government plans to increase the size of its Red Sea fishing fleet, and establish a number of small freezing and storage plants for the use of fishermen along the Red Sea and Gulf of Suez coasts. The plants will not be on a large scale. Another plan is to establish a shark-liver oil processing plant in the Red Sea. Even if these plans materialize in 1960, it is doubtful they will have much immediate effect on the country's fishing industry.

The prospects for any large increase in Egypt's over-all fish production in 1960 are not bright; however, inland water catches may increase somewhat. Any such increase will probably be consumed locally.

In the long run Egypt's fishing industry may have considerable potential. If more coordinated and intensive research indicates the existence of fish resources that lend themselves to commercial exploitation, the development of the industry will depend upon (1) the acquisition of modern efficient fishing vessels and the training of local fishermen in their use, and (2) the continued improvement of local distribution and processing facilities. From the point of view of foreign trade, the expansion of shrimp production would appear to be the most promising and should yield the highest returns. (United States Consulate in Alexandria, October 6, 1959.)



Ghana

UNITED STATES FISH CANNERY AND GHANA GOVERNMENT JOINTLY EXPLORING GULF OF GUINEA FOR TUNA:

A United States west coast cannery and the African Republic of Ghana are jointly conducting fishery explorations in the Gulf of Guinea off central Africa. The objectives of the ex-

plorations are: (1) to assess the fishery resources of the coastal and high seas waters adjacent to Ghana; (2) to stimulate a new Ghana fishery for pelagic species if they are found to be available in sufficiently large concentrations; (3) to study the possibilities of establishing a tuna processing and freezing plant in Ghana; (4) to study the biological and oceanographic conditions existing in the waters of the Gulf of Guinea and along the shores of the Gold Coast.

The diet of the Ghana people consists mainly of fish and marine products as a source of protein. Beef is not raised in Ghana due to the lack of grasslands and the presence of the tsetse fly. As a consequence the six-million Ghanians in their diet rely very heavily on fishery products.

Unfortunately, the fishermen of Ghana cannot fulfill the growing requirements of the nation. Importation of fishery products is not practical from a financial standpoint. As a consequence more fishery development is needed within the country.

The Government of Ghana, in an effort to alleviate the present status, has teamed up with a United States fish cannery. Together they will ascertain the potential of the coastal fisheries as well as the pelagic offshore stocks. From this arrangement Ghana will be able to learn more efficient means of catching fish. On the other hand, the United States cannery also has an interest in the pelagic fishes of the Gold Coast. If the explorations disclose an abundance of tuna and tuna-bait fishes in the vicinity of Ghana, the cannery will begin tuna fishing operations there. Some of the fish caught would supplement the local landings and the remainder will be shipped to the cannery's new cannery being built in Puerto Rico. Eventually, the cannery plans to build a cannery in Ghana.

The vessel employed for the explorations is the 220-ton capacity tuna clipper *Columbia*. Manned by a crew of eight United States fishermen and a fisheries scientist, the *Columbia* arrived in Ghana to commence operations on November 3, 1959. The remainder of the crew consists of five fishery technicians from the Ghana Fisheries Department. While exploring African waters for the next several months, the *Columbia* will sail from Takoradi, Ghana.

Throughout the cruise biological and oceanographic observations will be made in conjunction with fishing. Some of the scientific objectives are: (1) to study the salinity, temperature, current, and thermocline distribution within the Gulf of Guinea over a period of several months; (2) to further relate these oceanographic phenomenon with the distribution of various types of fishes; (3) to collect, identify, and study the distribution of inshore and pelagic fishes; (4) to contribute knowledge to the biology of the yellowfin and skipjack tunas. The studies will include food habits, growth rate, size composition of schools, population structure, and fecundity. A special effort will be made to collect larval tunas and find tuna spawning areas by means of plankton tows.



Honduras

REVISION OF FISHING LAW PLANNED:

As the result of certain clauses contained in the Honduran Law of Fishing, commercial fishing in Honduran waters by foreign vessels was virtually suspended during July 1959. On August 15, however, Acuerdo No. 1351 was issued by the Executive Branch of the Government of Honduras whereby the Minister of Natural Resources is given authority to consider and grant temporary permits to fish in spite of the restrictive clauses of the Law. This Acuerdo also stipulates

Honduras (Contd.):

that revision of the existing law is to be considered by the session of Congress which convened in November.

With a view towards acting upon this last stipulation of the Acuerdo, the Ministry of Natural Resources is drafting a revised Fishing Law and preparing the Regulations to the Fishing Law, states an October 19, 1959, dispatch from the United States Embassy at Tegucigalpa.



Hong Kong

FISHERIES TRENDS, SECOND QUARTER 1959:

During the second quarter of 1959, Hong Kong marketing cooperatives handled 187,492 piculs (about 25.0 million pounds) of fresh marine fish and 23,712 piculs (about 3.2 million pounds) of salted fish landed. During the same period, 4,190 piculs (about 559,000 pounds) of shrimp were handled by the Fish Marketing Organization. The average price in the second quarter of 1959 for fresh fish was HK\$0.70 per catty (about 9.2 U. S. cents a pound).

Shrimp sales were not recorded by the marketing organization after June 17 as they were no longer eligible for the United States market. During 17-day period in June only 246 piculs (about 32,000 pounds) were sold. Widespread irregularities in exports to the United States were brought to light and the U. S. Treasury Department refused to approve further imports from Hong Kong pending establishment of a new certification procedure.

The Chinese Communists continued to harass fishing boats from Hong Kong when they left Hong Kong waters.

During a Legislative Council Budget debate the Deputy Colonial Secretary made some suggestions for improving the fishing fleet. In mentioning the lower landings in 1958, he suggested a new type of ocean-going trawler that could

fish in "safe" international waters and thus ensure continuity of supplies. Cost per boat would approximate HK\$500,000 (about US\$87,500). The only staple food in which Hong Kong is self-sufficient comes from its fishing fleet, the United States Consulate in Hong Kong reported on October 15, 1959.



Iceland

SOVIET UNION BUYS 2,800 TONS OF ICELANDIC FROZEN FISH FILLETS:

On October 23, 1959, the Icelandic newspaper *Thjodviljinn* announced that the Soviet Union had agreed to purchase 2,800 metric tons of frozen fish fillets. The Ministry of Commerce had announced on August 6 that the Soviets were considering the purchase of 6,000 tons of frozen fillets to bring their purchases up to the 32,000 tons provided for in the trade agreement.

Although the Soviet purchases of frozen fish fillets are still 3,200 tons below the amount provided for in the trade agreement, the purchase of 2,800 tons should enable Iceland to close out its 3-year trade agreement with Russia on December 31 with payments about in balance.



India

TWO SMALL SHRIMP CANNERIES IN OPERATION:

A small shrimp cannery in the fall of 1959 started to can shrimp in the small fishing village of Malpe, Mangalore, South Kanara, India. The equipment of the plant was designed and locally fabricated by its manager, a United States-educated fisheries engineer. The cannery at Maple has an output of about 3,000 cans per 8-hour working day, and is the second cannery in operation in India.

A somewhat larger cannery, located at Cochín, started packing shrimp in September 1958 and its capacity is rated

India (Contd.):

at 12,000 cans per 12-hour working day.

Both of the canneries put together are expected to pack annually nearly 2 million cans, valued at about Rs. 3 million (US\$628,000) to the canners, for export to the United States. (The Bombay East Indian, October 1, 1959.)



Ireland

TERRITORIAL FISHING LIMITS TO BE MEASURED FROM BASE LINES INSTEAD OF SHORELINE:

The Eire Government has given notice that from January 1, 1960, the territorial fishing limits around the Irish coast will operate on the base-line system. This means that the limit line will be measured from base lines drawn from headland to headland and will not be measured from the shoreline.

However, Irish vessels will be permitted to fish the grounds excluded to non-Irish craft by the introduction of the system. Irish fishermen have been pressing for base-line limits.

The Eire Government, in a note explaining the reason for their action, stated that the old system gave rise to many difficulties. The new one would give the State jurisdiction over a greater sea area. (The Fishing News, October 23, 1959.)



Japan

AGREEMENT ON SAFE FISHING SIGNED WITH COMMUNIST CHINA:

The conclusion of a safe fishing agreement between the Japan-Communist China Fisheries Council and the China Fisheries Association was announced on October 29, 1959, in Peiping by a joint declaration of the two contracting parties. A Japanese member of the standing committee of the Japan-Communist China Fisheries Council, signed the agreement for the Japanese side.

The agreement designates two ports on the mainland, Lien Yün Kang and Wu Sung Kou, as ports of refuge for Japanese fishing boats in case of typhoon, shipwreck, accident, or sickness. The Japanese named the ports of Nagasaki, Tananoura, and Yamskawa. Severe restrictions are placed on the activities of Japanese boats and men while in Chinese Communist ports, and it is specified that the agreement does not apply to cases of sickness which are of an epidemic nature.

The Japan-Communist China Fisheries Council has applied to the Japanese's Maritime Safety Board of the Ministry of Transportation for official approval of the arrangement. In view of the fact that the agreement deals with humanitarian questions that are "non-political in nature," approval is expected in the near future. From a practical standpoint the Japanese consider the agreement to be advantageous, because their boats frequently fish in Communist China's coastal waters while few Chinese boats approach the shores of Japan, the American Embassy in Tokyo reported on November 1959.

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BUILDING OF REPLACEMENT FISHING VESSELS STEPPED UP:

An increase in building of replacement fishing vessels in Japan is aiding that country's shipbuilding and related industries. Most of the new vessels are for tuna fishing. Due to the stabilization of the tuna industry, construction tonnage has increased to almost three times as much as previous years and shipyards and ironworks are said to be holding orders for the coming six months.

Compared with construction tonnage of 25,463 in 1958, by September 1959 it had reached 49,850 tons, almost twice as much. One reason for this increase in construction is the fact that a considerable amount of money is loaned out by financing institutions. Another reason is that many fishing vessels have reached both fishing companies and individual owners have shifted from offshore waters near Japan to distant fishing and direct exports or landings of catches of foreign ports or bases in the Atlantic.

Japan (Contd.):

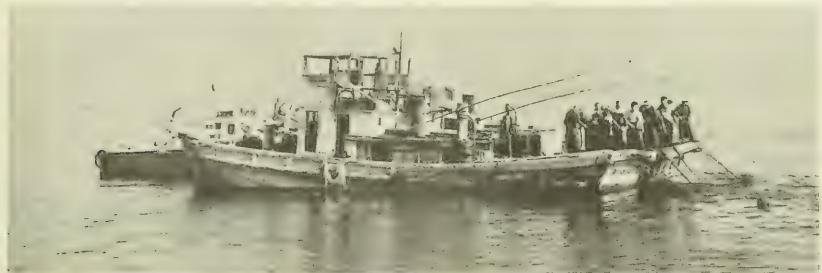
As far as the number of vessels is concerned, there does not seem to be much difference from 407 as of September 15, 1958, and 420 vessels as of September 1959. But while there was a drop of 34 wooden fishing vessels, there was an increase of 47 steel vessels in the first nine months of 1959. Each firm and vessel owner is trying to improve equipment and the efficiency of the fishing vessels, and at the same time a tendency is noticeable for building larger vessels. For instance, three

company's plans to expand its tuna fishery. After completion these vessels will be based at Misaki, Kanagawa Prefecture. (Fisheries Economic News, November 5, 1959.)

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CANNED SALMON SALES TRENDS:

The Japanese Canned Salmon Sales Company commenced the second-period sale of canned salmon early in November 1959, and in addition to 225,000 cases of canned pink salmon, about 370,000 cases of red, silver, and chum salmon



Pelagic two-boating trawling near Shizuoka, Japan. Shows nets being hauled in.

firms are building tuna vessels of the 500-2,000 ton class. According to the shipyards, all the shipowners are trying to figure out how the fish hold can be made larger in order to utilize the ship's tonnage to the maximum. For this purpose, they are making the engineroom smaller and the weight of the main engine lighter. In the first nine months of 1959, vessels built or building for the skipjack tuna fishery totaled 123 as compared with 62 vessels built or building by September 15, 1958.

The Japanese Fishery Agency comments that the present condition does not necessarily indicate similar activities in 1960 and some quarters in the industry seem to be of the opinion that construction tonnage may be beginning to decrease. (Suisan Tsushin, October 30, 1959.)

One Japanese firm on November 5, 1959, was reported to have ordered two vessels of 480 tons each from a shipyard in Shizuoka Prefecture. Construction of these two vessels is part of the

were expected to be sold for export to Britain. Including those sold during the first period, the total sold to Britain in 1959 is estimated to be 1,100,000 cases.

Also, about 40,000 cases (tall cans) of pink salmon for the United States and some 110,000 cases for areas other than Britain, United States, and Canada were expected to be sold. With the 40,000 cases of tall cans and 250,000 cases of No. 2 cans, a total of 490,000 cases of canned pink salmon was sold to the United States. (Suisan Tsushin, November 4, 1959.)

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EXPORTS OF SELECTED FISHERY PRODUCTS TO THE UNITED STATES, JANUARY-JUNE 1959:

During the first six months of 1959, Japanese exports of 37,300 metric tons of frozen tuna to the United States were valued at US\$10,531,000, an increase of 29.9 percent in quantity and 26.1 percent in value, as compared with the same period in 1958. Canned tuna exports (4,578

Japan (Contd.):

tons) to the United States January-June 1959 were valued at US\$4,614,000, a decrease of 47.5 percent in quantity and 35.2 percent in value from the first six months of 1958. Exports of other canned fish (mostly salmon and oysters) in January-June 1959 were up sharply (33.7 percent in quantity and 21.6 percent in value) from the same period in 1958. However, exports of fish and marine-animal oils were down 91.4 percent in quantity and 70.4 percent in value the first six months of 1959 from the same period of 1958. (United States Embassy, Tokyo, October 14, 1959.)

Japan's Exports of Selected Fishery Products to the United States, January-June 1959				
Item	Quantity		Value	
	January-June		January-June	
	1959	1958	1959	1958
	(Metric Tons)		(US\$1,000)	
Tuna, frozen . . .	37,300	28,708	10,531	8,348
Tuna, canned . . .	4,578	8,719	4,614	7,118
Crab meat, canned . . .	1,794	1,293	4,366	2,928
Other canned . . .	13,148	9,837	9,779	8,042
Fish and marine animal oils	779	9,068	962	3,248

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MARINE-ANIMAL OIL EXPORTS, SUPPLY, AND UTILIZATION:

Exports: Japan's exports of edible marine-animal oils (fish-liver and whale oils) dropped only 2.3 percent from 1958 to 1959. However, exports of inedible marine-animal oils (sperm-whale oil) in 1959 of 11,000 metric tons were lower (33.2 percent) than the exports of 16,471 tons in 1958.

Supply and Utilization: During Japanese fiscal year 1959 (April 1959-March 1960), out of an estimated total supply of 177,670 metric tons of marine-animal oils (edible and inedible), 98,470 tons or 55.4 percent will be exported 41,900 tons will be used for industrial products, and 37,300 tons will be consumed in the manufacture of edible margarine and shortening. (United States Embassy dispatch from Tokyo, dated November 11, 1959.)

Table 2 - Japanese Estimated Utilization and Supply of Marine-Animal Oils, Fiscal Year 1959 (April 1959-March 1960)				
Product	Margarine and Shortening	Industrial Use	Exports	Total
Whale oil	21,100	2,000	84,140	107,240
Fish oil	16,200	15,600	3,160	34,960
Sperm-whale oil	-	24,300	11,170	35,470
Total	37,300	41,900	98,470	177,670



Korea

FISHING INDUSTRY SUFFERS SEVERE DAMAGE FROM TYPHOON:

Typhoon Sarah swept across southern Korea on September 17, 1959, and left behind an estimated 669 persons missing and almost 800,000 persons homeless. Property damage, not yet all officially listed, is estimated to have exceeded US\$100 million.

Hardest hit was the Korean fishing industry which had been gradually developing under joint Republic of Korea-United States overseas mission (International Cooperation Administration) assistance to the point where it had become capable of supplying Korea's need for fisheries products and to provide a surplus for export.

United States fisheries technicians report that prior to 1959, a total of \$3,217,000 had been provided to rehabilitate the Korean fisheries program; and that current year's operations provide an additional \$480,000 in direct support from Defense Support Appropriations and \$659,000 from counterpart funds.

Estimated damage to fisheries installations in Kyong Sang Namdo Province, hardest hit by the typhoon, has been listed as at least 2,652,850,000 hwan (\$5,305,700). Because communications with many of the areas have not yet been re-established, this total loss may rise much higher. Two other provinces, less seriously affected, may bring the total loss to the fishing industry of Korea to \$18,000,000.

One major phase of the United States Aid program has been to assist the Ko-

Table 1 - Japanese Marine-Animal Oil Exports, 1958-59		
Product	1959	1958
	(Metric Tons)	
Edible:		
Cod liver oil . . .	1,200	1,656
Shark liver oil . .	100	228
Fish liver oil . . .	1,100	806
Whale oil	84,000	85,735
Total edible	86,400	88,425
Inedible:		
Sperm-whale oil . .	11,000	16,471
1/Preliminary estimates.		

Korea (Contd.):

rean Fisheries Associations to rebuild, remodel, or modernize the vessels in Korea's fishing fleet. On the basis of present information over 3,000 boats including 16 of the powered vessels which were replacing former craft were destroyed. Seven other powered vessels were lost, and 15 were partially destroyed. Vessels lost, damaged, or destroyed include many new craft built with USOM funds and on which the construction had been completed but the boats were awaiting the delivery of motors already in the warehouses.

Damages to Government facilities for fisheries research, demonstration, inspection, processing, and warehousing in the Pusan area amounted to 58,000,000 hwan (\$116,000) and much of this was constructed or operated as part of the fisheries program. An additional 24,000,000 hwan (\$48,000) was reported from various branch research stations and hatcheries in the Mokpo and other outlying areas.

Until September 17, 1959, the USOM fisheries program for Korea had expected to report unusual progress in implementing its current program. Typhoon Sarah has made it necessary for the Korean fishermen--and the United States aid program to the Korean fisheries industry--to make a fresh start. Already this is being done, with special survey teams in the disaster area to investigate what can be salvaged and to meet with the various fisheries guilds to help them develop ways to finance the reconstruction. Relief aid is already moving into the disaster area, and a formal request for long-range aid assistance has been forwarded to Washington, the United States Embassy in Seoul reported on October 21, 1959.

FISHING INDUSTRY EQUIPMENT LISTED FOR DUTY-FREE ENTRY:

The Korean Ministry of Finance issued two ordinances (Nos. 174 and 175) on October 20, 1959, which revised the existing provisions in Ordinances Nos. 54 and 55 for exemption of customs duties on certain imports. Public Notice No. 197 of October 20, 1959, issued by the Ministry of Finance spells out in de-

tail the specific machinery and equipment entitled to duty free treatment for each important and essential industry. Duty free items concerned with the fishing industry are as follows:

Equipment for Fishing Fleet: Fishing boats (50 gross tons up, under 5 years boat-age); fish detectors; direction finders; engines; whaling guns; net hoisters; fish pumps; and fishing nets (synthetic fibre products only).

Fish Canneries: Vacuum seaming machine; can washing machine; shell removing machine; filling machine; vacuum can inspecting machine; can drying machine; magnetic sterilizing machine; magnetic thermometers; can-lid making machine; and generators.

Agar-Agar Industry: Compressors; centrifugal separators; dryers; filtering machine; agar-agar packing machine; agar-agar cutters; and generators.

Fish Meal and Fish Oil Industry: Fish cooking machine; compressors; grinding machine; dryers; sieves; separators; distilling apparatus; electric current inducting and adjusting equipment; temperature regulator; and generators. (United States Embassy dispatch from Seoul reported November 3, 1959.)



Libya

TUNA LANDINGS UP FOR 1959 SEASON:

Landings of tuna at principal Libyan ports during the 1959 season totaled about 1,950 metric tons and the season was considered a successful one. The landings by ports are as follows: Zuara, 400 tons; Marsa Zunga, 280 tons; Zansur, 300 tons; Sidi Billiman, 420 tons; Kliton, 300 tons; and Misarata, 250 tons.

Additional supplies of tuna were received by a tuna canning company located in Zuara from Japanese tuna fishing vessels. These supplies enabled the cannery to extend its canning season for three months or until December. As a rule the Libyan coastal fishing season ends in August.

The tuna landed by the Japanese were smaller, but the meat was whiter and

Libya (Contd.):

the Zuara cannery believed the tuna packed from the Japanese fish would be attractive to the Americans in Libya. One problem remained unsolved regard-

tends to declare as having pioneer or protective status. The new list increases the number of industries likely to qualify from 31 to 34 and products from 174 to 189. Included in the list of products proposed for pioneer status are: Fish, includ-



Tuna fishing with set nets off coast of Libya. Net extends almost two miles from shore. Fishermen use barges first to put out a wire skeleton, held in position by anchors, and then fix the net over the wire. This takes 60 fishermen 2 to 3 weeks. Catches per haul vary from 12 to 500 tuna.

ing the landings of Japanese tuna--that is the customs duties to be assessed by the Director of Customs. (United States Embassy dispatch from Tripoli reported October 12, 1959.)



Malaya

FISHERY AND WHALE PRODUCTS PROPOSED FOR PIONEER STATUS:

On October 1, 1959, the Malayan Federation promulgated its eighth notice of products and industries which the Minister of Commerce and Industry in-

ing crustacea, molluscs, cetacea (whales), and preparations thereof. (United States Embassy dispatch from Kuala Lumpur, October 6, 1959.)



Mexico

EXPORT DUTIES ON FISHERY PRODUCTS CHANGED EFFECTIVE AUGUST 8, 1959:

Export duties on some of Mexico's fishery products were reduced effective August 8, 1959 (announced in the Diario Oficial on August 4, 1959).

Mexico (Contd.):

Mexico's Export Duties on Fishery Products Effective August 8, 1959, with Comparisons							
Tariff No.	Product	NEW RATES			OLD RATES		
		Ad valorem	Specific		Ad valorem	Specific	
		%	Pesos Per Gross Kilo	US\$ Per Short Ton ^{2/}	%	Pesos Per Gross Kilo	US\$ Per Short Ton ^{2/}
040-00-02	Oysters in the shell	10	-	-	20	-	-
040-00-06	Tortoise shell turtles	10	-	-	20	3.00	218.00
040-00-99	Live animals, edible; from salt or fresh water, not specified	15	-	-	12	-	-
041-00-00	Fresh abalone whole, with or without shell	10	-	-	10	0.03	2.18
041-00-01	Fresh abalone fillets, refrigerated or frozen	5	-	-	8	-	-
041-00-03	Clams, without shell, fresh or refrigerated	5	-	-	10	0.03	2.18
041-00-09	Shrimp, fresh or refrigerated, from Gulf of Mexico	25	1/0.003	0.22	35	1/0.003	0.22
041-00-10	Shrimp, fresh or refrigerated, from the Pacific	25	1/0.003	0.22	35	1/0.003	0.22
041-00-13	Crayfish, "moro," fresh, refrigerated or frozen	10	-	-	10	0.03	2.18
041-00-14	Crayfish, other than "moro," fresh, refrigerated or frozen	10	-	-	10	0.03	2.18
041-00-19	Crabs, fresh, refrigerated or frozen	10	-	-	10	0.03	2.18
041-00-22	Lobster, fresh, refrigerated or frozen	10	-	-	10	0.03	2.18
041-00-27	Oysters, shucked, fresh, refrigerated or frozen	5	-	-	10	0.03	2.18
041-00-32	Goose barnacles, fresh, refrigerated or frozen	10	-	-	10	0.03	2.18
041-00-96	Crustaceans, not specified, fresh, refrigerated or frozen	15	-	-	20	0.03	2.18
041-00-97	Mollusks, not specified, fresh, refrigerated or frozen	15	-	-	20	0.03	2.18
041-00-98	Fresh-water fish, not specified, fresh, refrigerated or frozen	12	-	-	12	0.01	0.73
041-00-99	Salt-water, not specified, fresh, refrigerated or frozen	12	-	-	8	-	-
042-00-00	Abalone, salted	3	-	-	5	-	-
042-00-01	Clams, shucked, salted	3	-	-	5	-	-
042-00-02	Dried shrimp, peeled or not, even if pulverized	20	1/0.003	0.22	35	1/0.003	0.22
042-00-03	Oysters, shucked, salted	3	-	-	5	-	-
042-00-04	Octopus, salted	3	-	-	5	-	-
042-00-98	Crustaceans or mollusks, not specified, smoked, salted, in brine, or dry	5	-	-	10	-	-
042-00-99	Fish, not specified, smoked salted, in brine or dry	5	-	-	10	-	-
044-00-99	Fish sounds	10	-	-	15	-	-

1/ Listed in tariff as 0.30 pesos per 100 net kilograms.

2/ Equivalent in US\$.

Mexico (Contd.):

EXPORT DUTIES INCREASED ON RED SNAPPERS, TURTLES, AND CRAYFISH:

The Mexican Government has increased export duties on red snapper, marine turtles, and fresh-water crayfish (*Diario Oficial*, October 21, 1959). In U. S. cents per gross pound the export duties now are about 1.2 cents for red snappers, 1.0 cent for turtles, and 2.8 cents for fresh-water crayfish.

The increases in duties were effected by increases in the official prices. It is not expected that these increases will have any appreciable effect on exports. In 1958 Mexico exported about 255 metric tons of red snapper, 32 tons of marine turtles, and one ton of fresh-water crayfish. All of these products were shipped to the United States.

MERIDA AREA SHRIMP FISHERY TRENDS, JULY-SEPTEMBER 1959:

Landings of shrimp from the Gulf of Mexico during the third quarter of 1959 in the Campeche-Ciudad del Carmen area exceeded the total catch of the second quarter by approximately 50 percent. A sudden drop in the price of shrimp in the Brownsville, Texas, market virtually eliminated the profits earned from this increase.

Table 1 - Landings of Shrimp at Carmen and Campeche, July-September 1959		
Month	Carmen	Campeche
	..... (1,000 Lbs.)	
July	844	291
August	848	338
September	1,397	302
Totals	3,089	931

The price drop was due largely to the high inventories in the United States. Heavy catches by United States vessels off the Texas coast added to the problem.

The new price level is actually not as low as it might seem, since prices have remained relatively high for the past two years. Previous to that, however, prices averaged about the same as September prices and lower.

Table 2 - Exports to U. S. of Selected Fishery Products from all Ports in the Merida Area, July-September, 1959			
Product			
Shrimp	Frozen Fish	Shark Fins	Shark Skins
..... (1,000 Lbs.)			
4,026	578	4	18

The local effect of this change in the market has been to further reduce the number of marginal-profit boats operat-

ing in the Carmen-Campeche area. At present production levels, a fair profit may be earned even at the lower prices, provided that the operation is properly financed. However, in the Carmen area especially, many owners who entered the shrimp business during its highly profitable days backed by very little capital are finding it increasingly difficult to finance their operations. Forced to resort to excessively expensive credit facilities with interest rates as high as five percent per month, these owners suffer most from the reduced profit margin. In Campeche, however, the effect is not as severe since the majority of the shrimp boat owners are local business men whose financial situation is more stable and whose livelihood does not depend completely on the shrimp catches.

The increased volume of production on the Yucatan Peninsula during the July-September quarter had little or nothing to do with the self-imposed white shrimp ban along the Campeche coast for two months last spring. The catches during the last quarter were primarily pink and brown shrimp, although signs of a new crop of small white shrimp recently appeared.

On October 18, a group of Mexican Federal Government technicians were visiting Ciudad del Carmen as their first stop in a tour of the Yucatan Peninsula aimed at the study of the various problems of the regional economy. The group, which included representatives of several Government departments, made the investigation under the direction of the Secretariat of the President. Meetings were held in Carmen with representatives of the shrimp industry and it was reported certain recommendations concerning their difficulties will be made by the Government later. It appears that the executive branch of the Government may be taking more of an interest in the problems of the shrimp industry.

Shrimp production for the third quarter of 1959 totaled about 4.0 million pounds in the Carmen-Campeche area. The comparable figure for the previous quarter was 2.6 million pounds. (United States Consulate in Merida, October 23, 1959.)

SHRIMP FISHERIES TRENDS, OCTOBER 1959:

The Mexican shrimp fishing industry, particularly the vessel owners, in October 1959 were discouraged over the drop in shrimp prices. Reports from the Pa-



Fig. 1 - New shrimp trawler (built in November 1958) approaching dock at shipyard in Mazatlan, Sinaloa, Mexico.

cific Coast indicated a decline in white shrimp production for the Guaymas-Mazatlan fleets. During the latter part of October some of those vessels began fishing for brown shrimp, as fishermen

Mexico (Contd.):

believed that the season for white shrimp was over. Because of the size and price of brown shrimp, the vessel owners claimed to be losing money on catches of that species.

At the west coast port of Salina Cruz, catches began picking up towards the end of October with landings consisting mostly of brown shrimp. Boat owners complained of low prices. Trips yielding less than 4,000 or 5,000 pounds of headless shrimp were reported to be in the red. Three Salina Cruz vessels fishing off Guatemala were forced into San Jose, Guatemala, for alleged illegal fishing in Guatemalan waters on October 25, 1959.

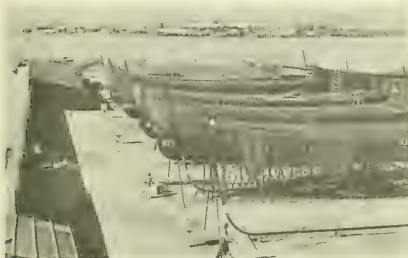


Fig. 2 - Portion of shipyard at Mazatlan devoted to construction of steel vessels.

In the Carmen-Campeche area of the Gulf of Mexico landings averaged less than 2,000 pounds a trip in October. At Carmen during the first half of the month, about half of the landings were pink shrimp. Of the remaining half, white shrimp accounted for about twice as much as brown shrimp. The white shrimp picked up at the end of the month and were reported running ahead of the

pinks, with browns insignificant. Sizes were averaging about 50 percent 26-30 count to the pound or larger.



Fig. 3 - Small shipyard near Guaymas, Sonora, Mexico, showing three partially completed 66-foot wooden shrimp vessels.

At Campeche landings were about 95 percent pink with white accounting for most of the remainder. Sizes were running larger than at Carmen with better than 75 percent being 26-30 count or larger, the United States Embassy in Mexico City reported on November 6, 1959.



Morocco

FISHING VESSELS AND GEAR:

In 1959, according to statistics published by the Moroccan Bureau of Merchant Marine and Sea-Fishing, the fishing fleet consisted of 147 trawlers (average 56 tons), 312 sardine seiners (average 18 tons), and 2,120 small trawlers and line boats (average 3.4 tons). In addition to the fishing vessels, six tuna trap nets (madragues) operated on the Moroccan coast. At the two principal

Moroccan Fishing Vessels and Gear					
Port	Trawlers (Chalutiers et chalutiers-sardiniers)		Seiners (sardine fleet, sardiniers)		Small Trawlers and Line Boats (3.4 tons average, palangriers)
	Number	Tons	Number	Tons	Number
Tanger	19	2,958	2	32	70
Khenitra (ex Port Lyautey)	5	246	1	6	99
Rabat	2	94	3	37	73
Mohammedia (ex-Fedale)	1	12	10	95	101
Casablanca	42	2,078	54	702	202
El Jadida (ex-Mazagan)	-	-	7	68	168
Safi	35	1,252	93	2,332	266
Essaouira (ex-Mogador)	3	118	13	270	197
Agadir	29	1,002	116	1,870	799
Larache	11	465	13	279	145
Totals	147	8,225	312	5,691	2,120

Morocco (Contd.):

sardine fishing ports of Safi and Agadir, nylon twine is being used more frequently in the seine nets. (United States Consul in Casablanca, October 5, 1959.)

* * * * *

SARDINE FISHERY TRENDS, THIRD QUARTER 1959:

Marketing Moroccan canned sardines continues to be a matter of selling at a profit in France at 5,800 to 6,200 French francs (about US\$11.81-12.63) per case and at a loss elsewhere at about 3,000 Moroccan francs (about US\$7.14) per case. Cannerymen seem now to be coming to terms with reality and are curtailing production to the approximate size of the French duty-free quota of 600,000 cases. In doing so, they face the opposition of the Government, which wishes to keep Moroccan sardines on the world market. The cannerymen and the Government have settled upon a compromise of 1,300,000 cases, which, added to the 650,000 cases left over from the 1958 season, make 1,950,000 cases to be sold, more than two-thirds of which will probably have to be sold at a loss. No effective measures have been taken to reduce the high cost price of Moroccan sardines in order to bring it down to a competitive level. At the beginning of September 1959, only 40 factories were active and many were canning mostly mackerel, which is saleable abroad.

According to a Casablanca commercial newspaper, a price of 3,500 francs (about US\$8.33) per case has been offered by Soviet Russia but with "conditions fixed by the buyers which partly nullify the additional value offered."

The dispute between the fishermen and the fish meal and oil industry about the price of sardines has not yet been settled. It had been agreed that the price of sardines for byproducts factories would rise during the season from 8 to 11 francs per kilo (0.86-1.2 U. S. cents a pound or \$17-24 a short ton). The factory owners later backed down on the agreement, due to the decline in prices for fish meal on the world market. The matter is now in the hands of

the Ministry for Industry, and fish are being sold for 9 francs a kilo (about 0.97 U. S. cents a pound or \$19 a short ton).

The fish meal industry has grown considerably in the past two years due partly to the closing of many canneries, and considerable investments have been made in equipping some 7 or 8 new plants, the United States Embassy in Rabat reported on October 20, 1959.

Notes: Moroccan franc valued at 420 francs to US\$1 and French franc at 491 francs equal US\$1.



Netherlands

ANTARCTIC WHALING FLEET DEPARTS AFTER SETTLEMENT OF DISPUTE OVER WAGES:

The wage dispute between the Union for Seamen and the Netherlands Whaling Company, which threatened to delay the departure of the factoryship Willem Barendsz and its fleet of catcher vessels to the Antarctic whaling grounds, has been settled for the 1959/60 season. The old labor agreement has been extended for this coming season. Wages were not lowered as was the original intention of the Company and agreement was reached concerning the premium to be paid the seamen on the basis of the whale oil produced. Earlier in 1959 the Dutch Whaling Company, in anticipation of a lower blue-whale unit quota, had announced its intention of seeking a new agreement with the seamen for lower wage levels. As the Netherlands is now no longer bound by the International Whaling Commission quota, the Company plans to increase the whale catch from about 700 blue-whale units to 1,200 blue-whale units.

The Willem Barendsz was delayed in sailing on the scheduled date of October 31 due to a delay in completing the installation of a new deep-freezing unit. However, the whaling fleet was reported to have left on November 4 and was expected to arrive on the Antarctic whaling grounds in time to operate the full 107 days as scheduled. (United States Embassy in Amsterdam reported on October 23, 1959.)

Notes: Also see Commercial Fisheries Review, December, p. 91.

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Netherlands (Contd.):

IMPORTS OF MARINE OILS,
JANUARY-JUNE 1959:

During the first six months of 1959, imports of marine oils (include oils produced at sea by Dutch fishing and

Netherlands Imports of Marine Oils, January-June 1958-59				
Country of Origin	January-June 1959		January-June 1958	
	Quantity Metric Tons	Value ^{1/} US\$ 1,000	Quantity Metric Tons	Value ^{1/} US\$ 1,000
United States . . .	5,318	929	2,382	444
United Kingdom . . .	-	-	256	60
West Germany . . .	863	153	1,263	266
Iceland	3,777	734	187	42
Norway	2,261	482	309	89
Portugal	332	44	256	41
Union of South Africa	-	-	282	66
Peru	495	73	150	28
Falkland Islands . . .	3,462	695	542	94
Japan	1,308	327	9	3/2
Sea 2/	16,710	3,324	18,038	3,913
Other	1,073	209	692	169
Total	35,599	6,970	24,366	5,214

1/Values converted at rate of 3.775 guilders equal US\$1.
2/Represents fish and whale oil production by Dutch fishing and whaling fleets.
3/Value estimated

whaling fleets) amounted to 35,599 metric tons, an increase of 46.1 percent as compared with the 24,366 tons imported in the same period of 1958. Values were up about 33.7 percent in the first six months of 1959 from January-June 1958. The approximate value per metric ton for imported marine oils declined from about US\$217.27 in the first half of 1958 to about 195.79 per ton in January-June 1959. (Report of October 3, 1959, from Agricultural Attache with U. S. Embassy, the Hague.)



Norway

EXPORTS OF MARINE
PRODUCTS, 1957-58:

Norwegian exports (includes products delivered directly from fishing grounds) of fishery and marine-animal products during 1958 amounted to 632,770 metric tons, valued at US\$165.2 million. As compared with 1957, the exports in 1958 were lower by 12.7 percent in quantity and 11.5 percent in value. The decline in Norway's exports of fish and fish and marine-animal by products was due largely to the failure of the 1958 winter herring fishery. Products derived directly from the herring fishery (exclusive

Norway's Exports of Marine Products, 1957-58					
Product	1958			1957	
	Quantity Metric Tons	Value 1,000 Kroner US\$1,000		Quantity Metric Tons	Value US\$1,000
Fresh Fish:					
Herring	30,080	14,377	2,014	57,138	3,839
Fillets	1,242	2,925	410	316	100
Other fish	26,984	49,112	6,878	26,375	6,417
Total fresh fish	58,306	66,414	9,302	83,829	10,356
Frozen Fish:					
Herring	34,484	22,499	3,151	45,686	4,009
Whole fish	14,933	37,999	5,322	7,872	4,152
Fillets	18,038	51,926	7,273	17,318	6,237
Total frozen fish	67,455	112,424	15,746	70,876	14,398
Dried, Salted, and Smoked:					
Stockfish (dried)	37,551	71,762	24,056	36,040	21,772
Klipfish (salted and dried)	33,467	108,201	15,154	42,193	20,058
Herring (salted)	60,263	57,936	8,114	62,883	8,381
Fish (salted)	13,957	23,255	3,257	9,942	2,324
Herring (salted and smoked)	3,864	5,866	822	4,004	833
Cod roe (salted)	1,747	2,020	283	1,387	239
Total dried, salted, and smoked	150,849	369,040	51,686	156,449	53,607
Shellfish	2,880	30,995	4,341	2,897	4,034
Canned fish (all kinds)	39,133	155,906	21,836	42,881	24,284
Fish and Whale Meal:					
Herring meal	89,437	102,976	14,422	120,468	20,005
Fish meal, ground fish	16,527	16,032	2,245	14,231	1,921
Sea weed meal	6,360	2,495	349	7,342	415
Fish liver meal	1,025	1,061	149	920	139
Whale meal	7,810	7,190	1,007	10,106	1,285
Total fish and whale meals	121,159	129,754	18,172	153,067	23,765
Fish oils and fish-liver oils	134,999	202,174	28,316	141,697	34,166
Refined hardened oils and fats, inedible and edible	57,989	112,739	15,790	72,988	21,941
Totals	632,770	1,179,446	165,189	724,684	186,551

Norway (Contd.):

of herring oil and herring oil refined into hardened oils and fats) declined from 290,169 tons in 1957 to 218,128 tons in 1958, or about 24.8 percent.



Pakistan

NEW WHOLESALE FISH MARKET AT KARACHI OPENED BY PRESIDENT:

On October 2, 1959, the New Karachi wholesale fish market was opened by the President of Pakistan. The Minister of Food and Agriculture made the introductory speech in which he outlined the status of the fish harbor and revealed for the first time publicly the Martial Law Regulation which had been signed on September 29, 1959, whereby no one is permitted to sell or otherwise dispose of fish, fresh, dried, or salted, except at places designated by the Central Government. This provision of the Martial Law applies only to wholesale auctions. Retail sales and sales by hawkers will be unaffected. After the Minister's speech, the President's speech emphasized mostly the food and nutritional value of fish and the necessity for developing fisheries as a means of increasing food supply.

The President then went out into the sorting room of the wholesale market. In the undredged channel there were several small gaily decorated fishing boats which could navigate the channel, and it had been arranged that one fishing vessel would tie up alongside and discharge its cargo which in turn would be sorted. The President watched the unloading and sorting, inspected the weighing system, and departed. The market was officially open.

The market did not actually start auction operations until October 6, at which time 60 metric tons of fish were disposed of. The quantity has increased, and on October 9, 140 tons were sold of which about half were fresh and the other cured or processed. The daily capacity had been estimated at 120 tons.

The channel at the waterside where fishing boats were to land their catch has not been dredged to sufficient depths and catches continue to be landed elsewhere and brought into the market by camels, rickshaws, and trucks, so that the planned smooth flow from the ships to the sorting room and into the auction room has not yet been effected.

The Government has stated that the fish harbor will be in full operation by the middle of 1960. Following is the status of the installations in the fish harbor, and the anticipated date of completion as set forth by the Government: Jetty built on the reclaimed land completed; wholesale fish market, completed; oil pier, completed; Fishermen's Cafe, completed; building for storing, display, and sale of fishing equipment, completed; four sheds to be used for making and mending nets as well as the fishermen's rest house, completed; the sea food cafe, construction completed but not open pending a decision as to who will operate; two cold storage plants, 120 tons each, completed; one chip-ice plant and 2 block-ice plants with combined capacity for freezing 40 tons a day, completed; research station (marine fisheries laboratory), January 1960; dredging, April 1960; boat basin, workshop, and slipway for repair of vessels, no estimated date of completion but construction will not begin until after dredging has been completed; curing yard, no estimated date of completion but construction is to begin early in 1960. Private enterprise area, 37,000 square yards have been earmarked for private industry and 7 plots have been allotted. Construction has started on one freezing plant. No date of completion indicated. The other 3 freezing plants, the 2 canning plants, and 1 shark-liver plant are just now placing orders for machinery; and road network, the major portion of network completed.

The Martial Law Regulation No. 75 promulgated at the time of the opening reads as follows:

"No person shall sell or otherwise dispose of, within the Federal Capital, fish whether fresh, dried or salted except at such place or places and in such manner as the Central Government may from time to time by notification in the official Gazette direct. . . ."

Pakistan (Contd.):

Under this regulation only the Karachi Fish Harbor, West Wharf, has been designated as the place for disposing of fish.

Official press handout hails this regulation as a welfare measure for the general fishing community and the consuming public by breaking the monopoly of the 11 auctioneers known as "moleholders" and who are said to "resort to malpractices of various sorts," so that "the fishermen do not get an adequate return for the labor involved in sea fishing." It also is touted as a means of increasing the foreign exchange earnings of the country by preventing the wastage of fish in transit and in handling as well as by improving the quality of processed fish. (United States Embassy report, Karachi, October 16, 1959.)



Peru

NEW LAW MODIFIES RESTRICTIONS ON EXPANSION OF FISH MEAL PLANTS:

The Peruvian Supreme Resolution No. 217 of December 1, 1956, which prohibited the establishment of new fish meal plants or the expansion of existing plants, has been superseded by Supreme Decree No. 09 of October 9, 1959.

At the same time, the Decree also modified Article 25 of Supreme Decree No. 12 of December 5, 1958, in such a way as to impose certain limitations upon the establishment or expansion of plants. Under the Decree of October 9, 1959, licenses will be issued only for land installations and for plants whose capacities do not exceed those of existing plants. Applications will be accepted only from individuals or entities having sufficient economic means to complete a project, and they must own their own fishing vessels. Licenses will not be issued for the operation of new plants in three specified zones, and closed seasons will be established by the Ministry of Agriculture as necessary for conservation. There are other provisions re-

lating to the use of licenses within one year of issuance, and to inspection.

Plants already in operation have 12 months from date of publication of the October Decree in which to bring their operations into accord with the Decree. Licenses limit tonnage to that which can be processed in 20 hours a day and 300 days a year.

In regard to the requirement that plant operators must own their own vessels, vessels normally engaged in supplying fresh fish for consumption, freezing, or canning have been diverted to anchovy fishing, causing a severe shortage in the supplies of edible fish. The vessel ownership requirement is designed to correct the shortage of fresh fish by preventing diversion of boats to the presently more lucrative fishery for the reduction plants. (United States Embassy reported from Lima on October 19, 1959.)

Note: Also see Commercial Fisheries Review, December 1959, p. 95.



Portugal

CANNED FISH EXPORTS, JANUARY-JULY 1959:

Portugal's exports of canned fish during January-July 1959, amounted to 38,605 metric tons (2,117,000 cases), valued at US\$19.8 million as compared with 32,868 tons, valued at US\$17.7 million for the same period in 1958. Sardines in olive oil exported during the first seven months of 1959 amounted to 27,858 tons, valued at US\$13.5.

Portuguese Canned Fish Exports, January-July 1959		
Species	January-July 1959	
	Metric Tons	US\$
Sardines in olive oil	27,853	13,495
Sardine & sardinelike fish in brine	1,072	216
Tuna & tunalike fish in olive oil	1,965	1,400
Anchovy fillets	3,790	2,843
Mackerel in olive oil	2,391	1,179
Other fish	1,529	702
Total	38,605	19,835

During January-July 1959, the leading canned fish buyer was Germany with 8,506 tons (valued at US\$4.2 million), followed by Italy with 5,385 tons (valued at US\$3.1 million), United States with

Portugal (Contd.):

3,614 tons (valued at US\$2.5 million), Great Britain with 3,426 tons (valued at US\$1.6 million), and Belgium-Luxembourg with 2,540 tons (valued at US\$1.2 million). Exports to the United States included 1,585 tons of anchovies, 406 tons of tuna, 1,536 tons of sardines, and 28 tons of mackerel. (Conservas de Peixe, September 1959.)

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CANNED FISH PACK,
JANUARY-JULY 1959:

The total pack of canned fish for January-July 1959 amounted to 17,679 metric tons as compared with 17,849 tons for the same period in 1958. Canned sardines in oil (9,257 tons) accounted for 52.4 percent of the January-July 1959 total pack, up by 1.0 percent from the pack of 9,164 tons for the same period of 1958, the September 1959 Conservas de Peixe reports.

Portuguese Canned Fish Pack, January-July 1959		
Product	Net Weight Metric Tons	Cases 1,000
In Olive Oil:		
Sardines	9,257	487
Sardinelike fish	504	26
Anchovy fillets	3,655	365
Tuna	3,345	119
Mackerel	306	12
Other species	612	32
Total	17,679	1,041

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FISHERIES TRENDS,
JANUARY-JULY 1959:

Sardine Fishing: During January-July 1959, the Portuguese fishing fleet landed 28,440 metric tons of sardines (valued at US\$2,983,756 ex-vessel or about \$104.90 a ton).

July 1959 landings of sardines totaled 11,353 tons valued at US\$1,288,174. Canners purchased 53.2 percent or 6,040 tons of the sardines (valued at US\$693,217 ex-vessel or about \$114.77 a ton). A total of 5,276 tons was purchased for the fresh fish market, and 37 tons were salted.

Other Fishing: The January-July 1959 landings of fish other than sardines were principally 16,044 tons of chin-

chards (value US\$1,093,495) and 3,015 tons of anchovies (value US\$275,061). (Conservas de Peixe, September 1959.)



South-West Africa

FISHING INDUSTRY
IMPORTANT TO ECONOMIC LIFE:

The South-West Africa fishing industry, centered around Walvis Bay and Lüderitz, has grown rapidly and makes a significant contribution to the Territory's economic life. It brings in over US\$25 million worth of business a year and employs some 4,000 persons. Six modern canneries and freezing plants permit efficient production of canned pilchards (sardine), fish oil, and fish meal.

South-West Africa's Production of Selected Products and Byproducts and White Fish Landings, 1957-58		
	1958	1957
	... (Short Tons) ...	
Pilchards:		
Canned	56,422	42,838
Fish meal	46,200	46,768
Fish oil	12,381	10,793
Spiny lobster:		
	... (1,000 Lbs.) ...	
Canned	430	1,808
Frozen tails	1,777	1,374
Fish meal	1,882	3,698
Landings of white fish	6,620	10,383

In 1959 the permissible pilchard-masbanker catch was increased by 50,000 tons to 300,000 short tons. This bodes well for the industry because there has been greater demand for fish meal and oil as well as for canned fish. Competition from the United States and Japan has been keen, however, particularly for canned fish in the Philippine market. Although canned spiny lobster production has fallen off, the United States market for frozen spiny lobster tails has kept the spiny lobster industry healthy and it has processed about 20 million pounds a year. (Canadian Foreign Trade, November 7, 1959.)

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NEW VESSEL FOR
SPINY LOBSTER RESEARCH BUILT:

A 74-foot vessel (similar to the *Trachurus* and *Kunene* built for the Union of South Africa Fisheries Divisions)

South-West Africa (Contd.):

has been built at Luderitz for the South-West Africa Administration for spiny lobster research.

Luderitz, one of South-West Africa's two fishing centers, has six large spiny lobster processing factories representing a capital investment of about US\$8.4 million. More than 1,000 fishermen and factory workers are dependent on the industry and during the past few years have suffered as a result of a sharp drop in the yearly catch. The Administration has a laboratory and three scientists in the town, but its only available vessel has been the 65-foot patrol boat Nautilus II.

The head of the Fisheries Section of the South-West Africa Administration said that the new vessel, which was to be named Angra Pequena, would cost about \$112,000 to build and equip. She would be powered by twin Diesel engines each developing 170 hp., and, like the other South-West Africa fishery research vessels, would be a twin-screw craft. She would have a speed of at least 11 knots. In addition to a large laboratory, she would have accommodations for 13 crew and scientists.

In addition to its proposed work on spiny lobsters, the South-West African Administration is making a substantial contribution to pilchard research with two modern vessels, the 82-foot Namib and the 70-foot Kuiseb, and a team of seven scientists.

Another project being undertaken by the Administration is the building, at a cost of \$98,000-\$112,000, of new laboratories at Walvis Bay. (The Australian Fishery Newsletter, September 1959.)



Spain

CANNED TUNA EXPORTS TO UNITED STATES INCREASE SHARPLY:

Since the inauguration of the new exchange rate on July 22, 1959, there has

been a sharp increase in exports of canned albacore tuna from Spain to the United States. From July 22-August 31, 1959, a total of 1,345,685 pounds (value US\$489,403) of canned albacore tuna and 58,918 pounds (value \$22,014) of other canned fish were exported to the United States. Total exports in 1958 to the United States of all types of canned fish amounted to 1,757,572 pounds, valued at US\$556,456.

Two factors are believed to have contributed to increased exports to the United States during July and August 1959. First, and believed to be of primary importance, is the adjustment in the exchange rate of 60 pesetas to the dollar. Previously canned fish exporters had been allowed premiums of up to 8 pesetas on the official rate of 42 pesetas to the dollar, bringing the previous effective rate up to a maximum of 50 pesetas to the dollar.

The second factor mentioned as a boost to export sales is the poor catches of summer albacore tuna by the Japanese fishermen which resulted in decreased exports by Japan of canned white meat tuna to the United States.

Spanish fish canners were optimistic over prospects for exports during the remainder of 1959, although their optimism was based primarily on the hope that albacore catches would continue to be plentiful. Sales to the United States of canned fish exceeding US\$1 million are forecast for the year 1959.

In commenting on the monetary stabilization program, one canner stated his belief that the program will be successful in the long run, and cited the increased exports of canned fish as evidence of short-run success in one sector. He added that the program must work, if industries such as fish canning are to survive. (United States Consulate in Vigo, reported September 11, 1959.)



Sweden

EXPORTS OF FISHERY PRODUCTS TO EAST GERMANY RESUMED:

Negotiations between officials of the Swedish West Coast Fishermen's Organization and East German authorities have resulted in the resumption of Swedish fish exports to East Germany. First shipments, it is said, will consist of deliveries from the 4,500 metric tons (about 100,000 cases) of herring stored in plants in southern and western Sweden. Later it is hoped to export fresh fish.

It is reported in the Goteborg press that the agreement provides that during the remainder of 1959, Sweden will be able to export 6,315 metric tons of fish (herring, eel, cod fillets, salmon, etc.) to East Germany as well as 1,825,000 cans of sprat and 100 metric tons of specialities for a total value of 6,500,000 crowns (US\$1,257,000). This amount will be in addition to the 9 million crowns (US\$1,740,000) provided for in the 1959 barter agreement with East Germany, according to an October 27, 1959, dispatch from the United States consul in Goteborg.

Noter Also see Commercial Fisheries Review, December 1959, p. 97.



Taiwan

FISHERY LANDINGS INCREASED IN 1958:

Salt-water and pond fish production by Taiwan in 1958 amounted to 229,667 metric tons--10.3 percent above 1957. The goal for 1959 is 242,000 metric tons. It was reported recently that production through July 1959 reached 136,045 tons and, despite flood damage to fish ponds, the 1959 production is expected to exceed the target.

Flood damage to fisheries was estimated officially at NT\$76,375,000 (about US\$2,117,000), almost all of which consisted of claimed damage to fresh-water ponds and to brackish coastal ponds near Tainan. A fisheries expert in September reported that the few fresh-water ponds in the flooded area had been repaired and restocked, at a total outlay to the Federal Agency of less than NT\$4

million (US\$111,000), and that most of the coastal ponds were better left unrepaired, since they obstruct drainage and are illegal. Thus, pond-fishery production has been little set back, and the abundance of water for ponds around Taoyuan, which frequently go dry in late summer, will probably assure an increased catch there. Certain funds were made available for rehabilitation of boats and fishing harbors.

Taiwan's fishing has expanded so fast that coastal and inshore trawling grounds are becoming less profitable, and the trawlers are tempted to wander afield. They stray occasionally within reach of Communist Chinese gunboats and are taken into custody. Though they are usually released, the Government has attempted to minimize incidents by setting limits to those parts of the Taiwan Strait and China Sea in which they can operate. The trawlers have regularly ignored the limits but, after the most recent incident last spring, the Navy began more rigid enforcement, and the trawlers have complained to the authorities that, unless restrictions are relaxed, the offshore and deep-sea fishery catch will shortly begin to decline. (United States Embassy dispatch from Taipei, October 22, 1959.)



Thailand

SHRIMP INDUSTRY BEING DEVELOPED:

The first shipment of frozen shrimp from Thailand to the United States took place in April 1959. The packer, with headquarters in Bangkok, has a complete processing and packing plant located in the Government freezer there. The facility offers a holding capacity of 3,500 tons. The one company is the only packer operating in the Government warehouse at present. The initial shipment of shrimp (packed in 5-pound cartons) was the first frozen product ever shipped from Thailand.

The Thailand packer expects to pack about 500,000 pounds during its first year of operation. It supplies fishermen with nets, and has secured services of Japanese technicians to teach native fish-

Thailand (Contd.):

ermen how to fish for shrimp with modern equipment.

The packer obtains mostly white shrimp, but has secured some tiger-stripe shrimp. Most of the catch has been jumbo size with very little smaller than 10-to-the-pound. The fishing season usually lasts about nine months. (Frosted Food Field, October 1959.)



Tunisia

FISHERY TRENDS, OCTOBER 1959:

In July 1959, the Director of the Tunisian Office National de Peche visited Italy where he arranged for the purchase of two used trawlers. He also concluded final construction details on 4 new trawlers being built in Italy as a part of the United States aid program to Tunisia. Two of these are to be delivered in February 1960 and two more in March. Two additional used trawlers may be purchased in Italy. The dinar-franc disparity continues to plague the Tunisian fishing industry which is also affected by Portuguese, Spanish, Japanese, and even Moroccan competition.

Tuna landings during the 1959 season, which ended in mid-July, were abnormally small. Only 200 metric tons were landed as compared to average annual landings of 1,000 tons. The light landings in 1959 may be attributed to any one or a combination of the following factors: nonappearance of tuna in Tunisian waters; depletion of tuna schools in the Mediterranean as the result of overfishing, and the fact that only two Spanish captains were available to set the fish traps for the Sidi-Daoud tuna canneries, Tunisia's largest. The Spaniards have been replaced by less experienced Tunisian trap captains.

The catch of sardines and sardine-like fish for the season which begins in late May and ends in November was poor as of early October. It is reported that price-wise Tunisia can now export to the French market, but that the

quality of Tunisian sardines is poor and French buyers are offering sales resistance. The principal reason for this is the poor handling techniques of the Tunisian fishermen, the fact that refrigeration is generally unavailable, and fish are delivered to the canneries in poor condition. However, it has been noted that total exports of salted and canned fish and shellfish increased about 21.6 percent during the first half of 1959 (264,706 dinars or about US\$630,000) as compared to the similar period of 1958 (217,696 dinars or about US\$518,000). (United States Embassy dispatch from Tunis, October 16, 1959.)



Turkey

PLAN TO ACTIVATE FISH MEAL AND OIL PLANT IN 1960:

The Turkish Meat and Fish Organization established Turkey's first fish meal and oil plant in Trabzon in 1958 and planned to begin operations in the 1958 season. The plant building and installation of machinery was actually completed, but activation has been delayed. Now the Meat and Fish administrators are planning to put the plant into operation early in 1960. This plant will produce industrial fish oil and fish meal. The main types of fish utilized will be porpoise and mackerel.

A small amount of fish oil is produced with primitive methods by the fishermen of the eastern Black Sea region. When they catch a porpoise, they boil it, skim off the oil, and use the meat scrap as fertilizer, as they have no fish meal reduction equipment, according to an October 6, 1959, report from the United States Agricultural Attache in Ankara.



Union of South Africa

PILCHARD-MAASBANKER LANDINGS FOR 1959 BREAK RECORD:

The 1959 pelagic shoal fishing season off the Union of South Africa's Cape west

Union of South Africa (Contd.):

coast closed at midnight on August 14, 1959, with a new record catch of 34,753 short tons, made up of 286,796 tons of pilchards, 19,484 tons of maasbanker, and 36,473 tons of mackerel. This catch was higher than that of the previous record season in 1952, and exceeded the 1958 catch substantially.

The decision to close the 1959 season two weeks before the expected closing date of August 31 was made on the recommendation of the Fisheries Development Advisory Council which met at the end of July. At this meeting the Council was informed by the Union's Director of Fisheries that the pilchard-maasbanker quota had already passed the 276,723 tons landed to the end of August last year. Almost the entire pilchard catch, he reported, had been taken from the area south of Cape Town; smaller fish were being caught and the pilchards were showing signs of early spawning.

On August 14, the notice closing the season was published in the Government Gazette. This closed the Cape West Coast to the catching of pilchards and maasbanker for canneries or fish meal plants for the period August 15 to December 31. Plants were being overhauled and refitted late in 1959 in preparation for the next season which was due to start in January 1960.

An outstanding feature of the 1959 season was the huge pilchard catch of 286,796 tons, more than the previous record of 214,533 tons set in 1958. The mackerel catch of 36,473 tons was also a record. But maasbanker landings of 19,484 tons were the lowest since 1947 when the industry had only just entered its period of intensive development.

Products produced from the Union of South Africa shoal fish landings were 71,505 tons fish meal, 3,592,482 Imperial gallons fish oil, 925,000 pounds canned pilchards, 6,923,371 pounds canned maasbanker, and 12,781,276 pounds canned mackerel.

In 1957 and 1958 maasbanker landings were boosted by brief periods of heavy catching. In 1959, however, there was no

maasbanker run, although boats moving between St Helena Bay and the Cape Peninsula fishing waters kept a close watch for the shoals.

Another feature of the season was the appearance of Hout Bay as a shoal fishing center. Its proximity to the best fishing areas proved extremely advantageous to its 2 fish meal factories which, with a reduction plant capacity of only 15 tons of raw fish an hour, handled some 20 percent of the quota fish catch. The 2 Saldanha Bay factories, also reasonably well placed, handled about 20 percent of the catch; 7 large factories on the southern shores of St. Helena Bay processed 55 percent and 5 percent was handled by the factories at Lambert's Bay and Thorn Bay.

It is estimated that 95 percent of the pilchard catch was taken from the waters south of Cape Town by a fleet of 150 boats, most of which had to travel several hours to and from the fishing area.

In 1959, for the first time, the Division of Fisheries attempted a forecast of the pilchard catch. The forecast was exceeded by 50,000 tons. The estimate was, however, based on one instead of three months' autumn temperature observations; and the low maasbanker catch with subsequent concentration on pilchards was an unexpected factor. According to the Fisheries Division, temperature observations made during the autumn of 1959 indicate a "reasonably good season" in 1960. The Division is now analyzing its observations and hopes to give a more detailed forecast of the 1960 catch.

With the big catch of pelagic shoal fish in Cape waters and likely landings at South-West Africa's Walvis Bay of 300,000 short tons, fish landings in the Union and South-West Africa are almost certain to be the highest ever. The pelagic shoal fish catch will alone exceed 630,000 tons; the indications are that trawl fish landings will again pass 100,000 tons; and line fishing, including a good catch of snoek, should add another 40,000 tons to bring the total to more than 770,000 tons--56,000 tons above the record 714,000 tons of 1958. (The South African Shipping News and Fishing Industry Review, September 1959.)



Union of South Africa and South-West Africa

PILCHARD-MAASBANKER FISHERY TRENDS, JULY AND AUGUST 1959:

During July 1959, South African west coast fishing vessels landed more pilchards than in any other single month in the history of the fishery. According to the Division of Fisheries, the Union of South Africa July pilchard landings were 65,175 short tons, more than 10,000 tons higher than the previous record set in June 1959. In addition, 104 tons of maasbanker and 48 tons of mackerel were landed in July 1959. These figures compare with 25,613 tons of pilchards, 1,109 tons of maasbanker, and 1,151 tons of mackerel caught in July 1958; and with 1,911 tons of pilchards and 403 tons of maasbanker in July 1957.

The Union's total pilchard-maasbanker landings to the end of July was 286,925 short tons, made up of 267,633 tons of pilchards and 19,292 tons of maasbanker. The mackerel landings of 35,574 tons brought the shoal fish total to 323,499 tons. The 1959 season continued for the first two weeks in August.

The July 1959 landings in the Union yielded 14,780 short tons of fish meal, 361,612 Imperial gallons of fish oil, 63,840 pounds of canned pilchards, 13,260 pounds of canned maasbanker, and 39,744 pounds of canned mackerel.

The August (1 through 14) catch for the Union of South Africa west coast was 19,163 tons of pilchards and 192 tons maasbanker or jack mackerel. This compares with 26,706 tons of pilchards, 800 tons of maasbanker, and 4 tons of mackerel caught in the entire month of August 1958 and 7,612 tons of pilchards and 749 tons of maasbanker in August 1957.

Products produced from the August 1959 Union of South Africa catch were 4,521 tons fish meal, 79,572 Imperial gallons fish oil, and 31,006 pounds canned pilchards.

The South-West African Walvis Bay landings in July 1959 were 54,838 tons of pilchards and 423 tons of maasbanker.

These landings yielded 10,598 short tons of fish meal, 3,596 long tons of fish oil, and 15,505,169 pounds of canned fish. Pilchard fishing from Walvis Bay, South-West Africa, was affected in August by very bad weather. Boats had to travel 4 to 6 hours north north-west to find fish. The South-West Africa catch in August 1959 was 33,931 tons which yielded 7,429 tons of fish meal, 1,943 tons of fish oil, and 7,980,708 pounds of canned fish.

When the South-West Africa Walvis Bay pilchard-maasbanker quota of 260,000 tons was increased for the season by 40,000 tons in July 1959, it was indicated that the season would end by October 10. Most of the factories found, however, that they could not make their individual quotas by that date and so the season was again extended to October 31. Reports from South-West Africa state that fish, though mixed in size and age, yielded an average of 10 Imperial gallons of oil per short ton of raw fish. Canning virtually stopped in August and landings after that month were utilized for meal and oil. (The South African Shipping News and Fishing Industry Review, September 1959 and October 1959.)

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THREE NEW PILCHARD RESEARCH VESSELS:

Three new research vessels for work on the pilchard-maasbanker resources of the south-west coast of South Africa have been completed and handed over to the Union of South Africa Fisheries Division.

The three vessels cost about £200,000 (US\$560,000). To recover this cost (and the capital cost of new shore laboratories), the South African Fisheries Development Corporation levies fishermen and processors 2d. and 4d. (about 2.3 and 4.7 U. S. cents) a ton, respectively, on pilchard-maasbanker and mackerel landings.

The research vessels will work in Benguela Current waters which extend for 1,000 miles from the Cape north to the mouth of the Kunene River on the South-West Africa-Angola border.

The Union and South-West Africa fish resources have given rise to an industry

Union of South Africa and
South-West Africa (Contd.):

operated by 300 large boats and 19 processing factories, with a capital investment of £12,000,000 (about US\$33.6 million). From a catch of up to 500,000 metric tons each a year, there is produced canned fish, fish meal, and fish oil valued at about £8,000,000 (\$22.4 million).

The largest of the three new research vessels, the 120-foot, 360-ton (displacement) Sardinops, is reportedly the largest ever built in South Africa. It was designed by the Food and Agriculture Organization Fishing Boat Section Chief and the managing director of a South African firm.

In a description of the Sardinops, the editor of South African Shipping News and Fishing Industry Review says:

"For a ship of her size, the Sardinops is remarkably spacious and well equipped. She has a crew of 14 and can carry up to three scientists. Six of the crew are accommodated forward in the fore-castle below the level of the main deck. Immediately aft of this crew space are three double cabins and a single berth cabin for 2 deck and 2 engineer officers, and 3 scientists.

"These cabins open out to a corridor which leads farther aft to the chemical laboratory which is situated below the larger biological laboratory built into welded steel deckhouse. This deckhouse has been placed about 2 feet inboard on each side of the bulwarks to provide adequate working space around the hydrographical booms and winches. It is topped forward by a spacious wheelhouse which projects on three sides over the main deckhouse structure. Aft of the wheelhouse is the captain's cabin and the wireless room.

"Officers' mess, petty officers' mess, toilets, washrooms, a galley equipped with refrigerator and electric range, and the engineroom casing are all built into the aft section of the deckhouse.

"The Sardinops is completely equipped to collect water samples, to make

plankton and blanket net hauls, to trawl, and to test different types of fishing gear. To carry out this work, she is fitted throughout with hydraulic trawl winches, long-line hauler, and hydrographic deep-water and shallow-water winches. . . . The winches are worked through hydraulic pipelines connected to a 60 hp. pump directly connected to the main engine. A second pump is driven from an auxiliary engine."

The ship is powered by a Danish five-cylinder two-stroke loop-scavenging oil engine developing 600/660 b.hp. at 310 r.p.m. This engine is connected through a nonreversible friction clutch to a controllable-pitch propeller. The control of the propeller pitch, clutch, and engine speed is effected directly from the bridge.

Auxiliary plant comprises two Diesel generating sets, each developing 86 hp. at 1,150 r.p.m. and driving 55 kw. generators.

On her trials and in subsequent initial survey cruises, the Sardinops easily maintained her designed service speed of 10 knots. The ship has proved remarkably simple to maneuver, and the combination of slow-running engine and controllable-pitch propeller gives her a range comparable to that of the much larger Africana II and also makes her an extremely economic vessel to operate.

Another interesting feature of the Sardinops is the wide range of wireless, fish-finding, and navigational equipment carried. Her wireless is a 120-watt radiotelephone set, and she has a Type 14 radar, log, gyro compass with bearing repeater, and vertical and horizontal echo recorders.

The two other new South African research vessels, Trachurus and Kunene, were designed by the chief of the FAO Fishing Boat Section. They will work nearer the coast than Sardinops. Each of the two is just under 70 feet long with moulded breadth of 22 feet and draught of 8½ feet. Each has a raking stem; raised enclosed fore-castle, a high aluminium deckhouse placed slightly aft; a transom stern; and a crew of 9 and 2 scientists in a comfortable cabin situated just below the foredeck. As in the

Union of South Africa and
South-West Africa (Contd.):

Sardinops, six seamen are accommodated in combined sleeping quarters and mess room in the forecabin.

The accent in these boats is again on concentrating as much equipment as possible in the restricted space available. Scientists have ample working space on the foredeck and aft.

The hydraulic trawl winch is fitted forward on the port side and alongside it, as aboard the Sardinops, is a long-line hauler. In the working section aft of the deckhouse is one of the two hydraulic winches for working plankton tow nets and the blanket net, and a second hydraulic winch with hydrographic boom is placed on the port side between deckhouse and bulwark.

Each boat has a single large laboratory situated immediately below the bridge. Galley and officers' messroom are below the main deck forward.

Vertical and horizontal echo-recorders are fitted in each boat, which also carries a radiotelephone.

The main engine of the Trachurus and the Kunene is a Danish 3-cylinder unit developing 180 b.h.p. at 375 r.p.m. Again, the engine is connected through nonreversible friction clutch to a controllable-pitch propeller and all control is from the bridge.

On trials, the Trachurus and Kunene maintained average speeds of 9.6 and 9.7 knots, and should therefore comfortably maintain their designed cruising speed of 9 knots. The boats also have been tried on preliminary research cruises and are considered ideal for their exacting work. (The Australian Fisheries Newsletter, September 1959.)



U. S. S. R.

FISHERY RESEARCH SUBMARINE
USED TO OBSERVE UNDERWATER
BEHAVIOR OF TRAWL:

The third trip of the Russian fishery research submarine Severyanka was de-

voted principally to observing the behavior of the otter trawl underwater. The Severyanka, a Russian submarine converted for fishery and oceanographic research under water, sailed on its third trip in April 1959. The operation required close and delicate maneuvering near the moving trawl.

The submarine remained directly below the trawl for several hours while engineers observed and made motion pictures of its behavior. In all, the studies extended over several days. It is expected that the results of the observations will aid in the design of new types of trawls.

At times, the Severyanka settled to the bottom of the sea for observations of marine life.

Work with hydroacoustical instruments made it possible to measure the zones of action of the echo sounders, that is, to explore the space around the submarine which is penetrated by ultrasonic energy and within the limits of which it is possible to detect schools of fish and other objects.

The third trip of the submarine was one of many trips scheduled for several years. Preparations for a fourth trip were made in mid-1959.

The Severyanka made its first trip in December 1958 in the region of Murmansk and its second trip in the herring fishing regions of the North Atlantic. Both of these trips resulted in much new and interesting scientific material. For example, the 24-hour behavior of Atlantic herring was studied. A number of oceanographic investigations were conducted. It was impossible, however, to observe the operation of the variable-depth or midwater trawl used because of the poor visibility under water during the polar night. Scientists aboard also found out how bottom fish react to danger and tested the effectiveness of finding fish with hydroacoustical instruments.

Increasing the catch of fish has been established as an objective of the Seven-Year Plan by the 21st Party Congress.

(This account (titled "Trawl above the SEVERYANKA") of the third trip of the

U. S. S. R. (Contd.):

Severyanka, research submarine of the All-Union Scientific Research Institute of the Fish Economy and Oceanography, by V. Azhazha, Chief of the Laboratory of Technical Instruments for Underwater Research, appeared in the May 24, 1959, issue of *Sovetskiy Flot*, Moscow.)

Note: Also see *Commercial Fisheries Review*, July 1959, p. 91; February 1959, p. 68.

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SALMON CATCHES AND HATCHERIES:

Russian salmon catches have steadily declined from 1955 through 1958, according to a statement made by Mikhail N. Mironov, a Soviet fisheries official, at the International North Pacific Fisheries Commission annual meeting in Seattle early in November 1959. Catches dropped from 172,400 metric tons in 1955, to 160,000 tons in 1956, 150,000 tons in 1957, and 73,000 tons in 1958. Although 1959 catches are not yet available, Mironov said that they will be below those for 1958.

The Russian official, an observer at the meeting since Russia is not a member of the Commission, states that his country is trying to build the runs of salmon by strict regulation of fishing off its shores, closing spawning areas and stream mouths to fishing, opening new fisheries research institutes, and expanding its hatchery program.

Russia will more than double its number of salmon hatcheries in the next seven years. A total of 38 new hatcheries is planned in order to bring the annual production of salmon to 1.4 billion fish. Russia now has 32 hatcheries, producing 600 million salmon.



United Kingdom

BRITISH QUEEN PROMISES CONTINUATION OF AID TO FISHING INDUSTRY:

A continuation of subsidies and grants to the fishing industry was promised by the British Queen in a speech, delivered at the opening of the new Parliament on

October 27, 1959. She stated: "Proposals will be put before you also to continue the subsidies and grants given to the fishing industry and to make further provision for cooperation in international measures of conservation.

"At the Second World Conference on the Law of the Sea, to be held next spring, my Ministers will work for a just and reasonable settlement of the unresolved problems of the breadth of the territorial sea and of fishery limits." (*The Fishing News*, October 30, 1959.)

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IMPORT CONTROLS ON FRESH AND FROZEN SALMON REMOVED:

A joint statement was made by the Departments of State, Treasury, and Commerce regarding an announcement by the United Kingdom that many of the remaining controls on imports would be removed, effective November 9, 1959.

This liberalization improves the opportunities of United States firms to compete in British markets. The list of products which United States exporters will now be able to market in the United Kingdom without quantitative restrictions includes fresh and frozen salmon. With the exception of tobacco manufactures and pharmaceuticals, all products previously imported from North America under the British Token Import Plan will also be free from restrictions.

The United Kingdom will still apply discriminatory restrictions on a number of dollar commodities including important fishery products like frozen halibut. The United States Government hopes that the United Kingdom will continue making rapid progress in removing restrictions until complete liberalization is achieved.

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USE OF ANTIBIOTICS AS A FISH PRESERVATIVE UNDER STUDY BY SCIENTISTS:

"Ice incorporating antibiotics" was the theme of a discussion radio broadcast by a scientist from the British Torry Research Station. He revealed that scientists are now collecting data for an expert panel which is finding out if the introduction of antibiotics as a preservative will involve any health hazard.

The scientist explained that by adding antibiotics they would hope to extend the usefulness of ice. By using chemi-

United Kingdom (Contd.):

cal compounds the aim would be to kill or keep in check the bacteria causing spoilage and so assist in preserving in better condition the first catches of long-distance trawlers.

Researchers have found that by adding only a few parts per million in the ice, they can extend the edibility by about 7 and sometimes even 10 days with fish like cod, haddock, and plaice. The use of the treated ice would enable the vessels to bring in fresher fish.

The antibiotics, said the scientist, could be added in small quantities as the ice is being made. This, he said, might add 15s. (US\$2.10) per ton to the price of the ice.

It is now known what sort of preservation the antibiotics can give. Data are being prepared for an expert panel set up under the Ministry of Health and the Ministry of Agriculture, Fisheries, and Food.

It is necessary to know what quantities of the antibiotics in the ice are absorbed by the fish during storage and what is the fate of these quantities after cooking. With this information the panel will be in a better position to decide whether or not there is any health hazard involved. (The Fishing News, October 30, 1959.)



Yugoslavia

CONTRACTS WITH JAPAN FOR
YUGOSLAVIA'S SUPPLY OF FROZEN TUNA:

Yugoslavia in October 1959 was reported to have contracted with three big fish suppliers of Japan to buy its entire annual requirements of frozen tuna

which is estimated to amount to about 7,000 metric tons. Delivery is scheduled October 1959-May 1960. Yugoslavia has imported tuna usually from Turkey which conducts a small fishery in the Black Sea. But currently the trade agreement between Yugoslavia and Turkey is suspended. Sales to Yugoslavia of Japanese frozen tuna caught in the Atlantic began early in 1959.

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TUNA FISHING METHODS
TAUGHT BY JAPANESE:

As part of a plan to increase tuna catches by Yugoslavian fishermen in the Adriatic, Japanese technical fishermen are teaching tuna long-lining methods to fishermen aboard Yugoslav vessels.

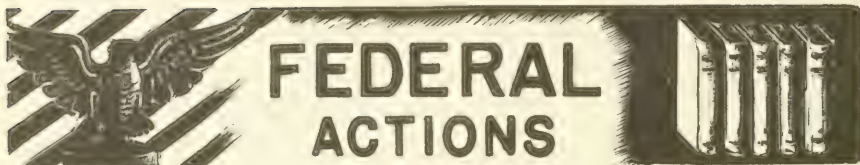
It has also been reported that a Yugoslavian businessman is visiting Japan in order to buy new tuna vessels from the country. Negotiations are under way for the building of 6 to 10 tuna vessels of the 1,000-ton class. There is also under discussion a plan that half the crew of the tuna vessels would be made up of Japanese fishermen.



ANTARCTIC FISH HAVE WHITE BLOOD

Russian scientists have discovered unique "white blooded" fish in the Antarctic. According to preliminary reports published by the Oceanographic Institute in Moscow, the research ship Ob, during the second expedition in the Antarctic, has made a discovery of extraordinary interest for zoologists: the scientists on board the Ob caught 18 fish whose blood contained no haemoglobin.

The 18 fish belonged to 8 different species and in four of these species this colorlessness or "whiteness" of the blood was encountered for the first time. Four of these species were entirely new to science. It is pointed out that this condition among vertebrae is unique since the presence of haemoglobin in the blood as carrier of oxygen is commonly accepted to be absolutely necessary for the sustaining of life. The Russian scientists have taken samples of this "white" blood of the fish to Russia in order to carry out further biochemical analyses and histological investigations. No explanation of this phenomenon has yet been given. (The South African Shipping News and Fishing Industry Review, June 1959.)



Department of the Interior

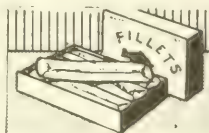
U. S. FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

FROZEN COD FILLETS VOLUNTARY STANDARDS PROPOSED:

Frozen cod fillet voluntary grade standards are proposed by the U. S. Bureau of Commercial Fisheries. The regulations are proposed for adoption in accordance with the authority contained in Title II of the Agricultural Marketing Act of August 14, 1956, as amended. Functions under that Act pertaining to fish, shellfish, and any products thereof were transferred to the Department of the Interior by section 6(a) of the Fish and Wildlife Act of August 8, 1956. These regulations, if recommended to the Secretary of the Interior for adoption and made effective, will be the first issued by the Department prescribing voluntary grade standards for frozen cod fillets.

Prior to the final adoption of the proposed regulations as published in the November 21, 1959, issue of the Federal Register, consideration will be given to any written data, views, or arguments relating thereto which were received by the Director, Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington 25, D. C., before December 18, 1959.



The proposed regulations include product and grade description; factors of quality, including evaluation of flavor, odor, appearance, size, absence of defects, and character; definitions and methods

of analysis; lot certification tolerances; and score sheet.



Treasury Department

BUREAU OF CUSTOMS

PROPOSED ANTIDUMPING REGULATIONS:

Proposed regulations under the Antidumping Act of 1921, as amended, were published in the October 10, 1959, Federal Register by the U. S. Bureau of Customs. The new regulations are intended to implement the 1958 amendment to the Antidumping Act in which Congress sought to provide for greater certainty, speed, and efficiency in the enforcement of the Act. The 1958 amendment also contained new definitions for determining fair market value of imported merchandise and eased the burden on domestic industry in proving injury.

The initial proposal on implementing the 1958 amendment was published by the Bureau of Customs in October 1958 and comments were invited. The Bureau incorporated a number of changes in the proposed regulations and again invited comments which were to be submitted not later than November 10, 1959. However, the Bureau of Customs announced in the November 21, 1959, Federal Register that comments would be received until December 31, 1959.

The proposed regulations cover suspected dumping; fair value of imported merchandise; determination of act or likelihood of sales at less than fair value; determination of injury; finding of dumping; action by the appraiser; release of merchandise; requirement of bond;

conversion of currencies; modification or revocation of finding; publication of findings; dumping duty; notice to importer; and method of computing dumping duty.

* * * * *

FURTHER RULING ON "IN BULK" AND "IMMEDIATE CONTAINER" FOR FISH BLOCKS:

Frozen fish fillet blocks packed with a wrapping that completely covers the fish and weighing less than 15 pounds are dutiable at the rate of $12\frac{1}{2}$ percent ad valorem, according to a December 1, 1959, ruling of the U. S. Bureau of Customs. This supplements but does not supersede previous rulings.

In November 1959 the Bureau of Customs at Washington, D. C., was asked to rule as to the duty status of fish blocks packed in their respective wrappings and tied together with rope, twine, or a strap in bundles of 4 or 5 blocks to a bundle. In the case for which a ruling was asked, reports from the field showed that the individual blocks are generally stamped with the word "cod," "hake," "haddock," or "pollock," so as to distinguish the kind of fish, as the price varies according to the kind of fish.

The fish blocks in question are classifiable under paragraph 720(b), Tariff Act of 1930, as fish, prepared, not specially provided for, following the deci-

sion in recent Customs Court decision (C. D. 2101). The question, then, was whether the fish blocks were "in bulk" or "in immediate containers weighing with their contents over 15 pounds each."

The Bureau of Customs pointed out that: "Lexicographers define the term 'in bulk' as meaning in a mass; not enclosed in separate packages or divided into parts; in such a state that any desired quantities may be removed. The Bureau believes that the fish blocks in bundles described. . . are not merchandise in bulk:

"Each individual frozen fish block is contained in a lightweight tray or carton (with top) which completely covers the frozen fish block, the weight of the contents and the cardboard tray is less than 15 pounds (usually $13\frac{1}{2}$ or $13\frac{3}{4}$ pounds), and is individually marked to describe its composition. When such blocks are tied together in a bundle the Bureau considers the tray or carton around each individual frozen fish block to be the immediate container. The fish blocks are classifiable under paragraph 720(b) as fish, prepared, not specially provided for, and, because their weight together with their immediate containers is not more than 15 pounds they are dutiable at the rate of $12\frac{1}{2}$ percent ad valorem under that paragraph, as modified."

Note: Also see Commercial Fisheries Review, December 1959, p. 102.



HIGH PERCENTAGE OF 1958 FISH AND SHELLFISH CATCH GOES TO MEAL AND OIL USE

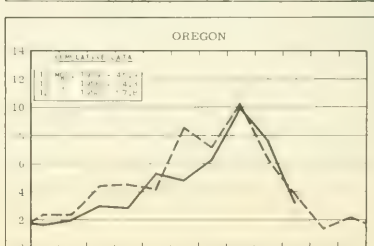
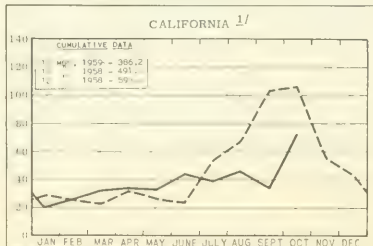
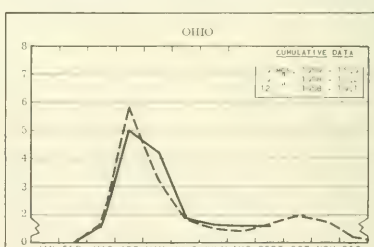
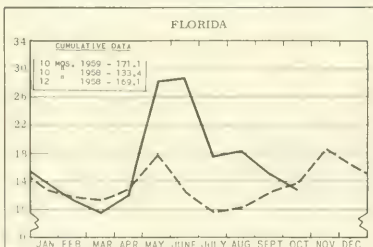
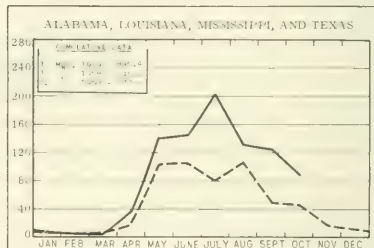
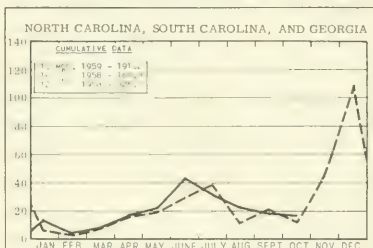
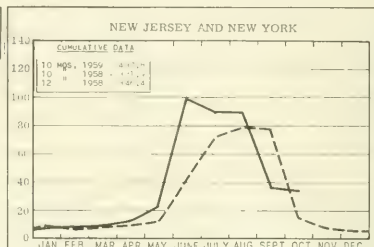
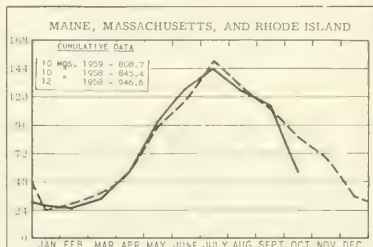
Information assembled by the U. S. Bureau of Commercial Fisheries on the utilization of the 1958 United States catch of fish and shellfish indicates that about 1.9 billion pounds, or 40 percent, was used directly for the manufacture of fish meal and oil. Another 700 million pounds of waste from fish marketed fresh, frozen, canned, and cured was likewise used in the manufacture of meal and oil.

Thus, the total poundage used for that purpose actually accounted for about 55 percent of the 1958 catch.



CHART 1 - FISHERY LANDINGS for SELECTED STATES

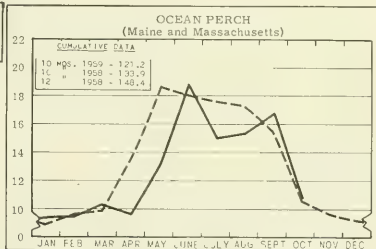
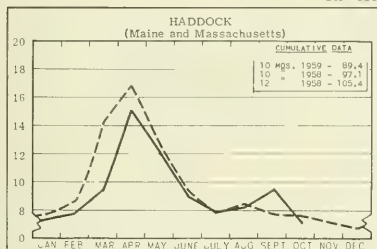
In Millions of Pounds



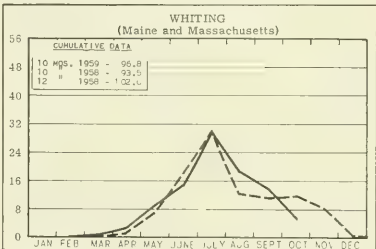
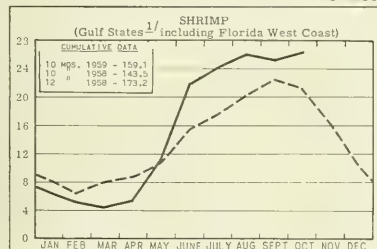
1/ ONLY PARTIAL--INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH LANDINGS AT PRINCIPAL PORTS.

CHART 2 - LANDINGS for SELECTED FISHERIES

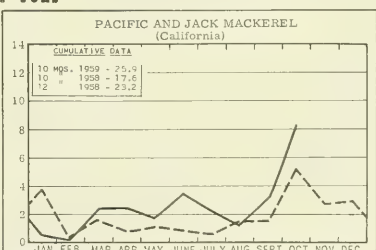
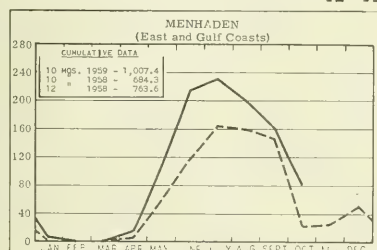
In Millions of Pounds



In Millions of Pounds



In Thousands of Tons



In Thousands of Tons

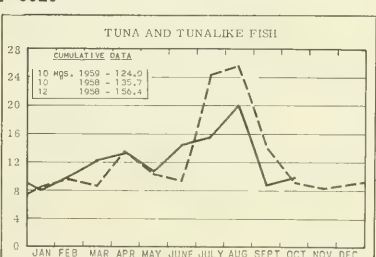
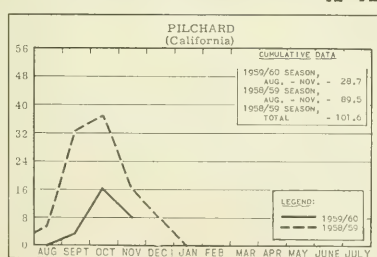
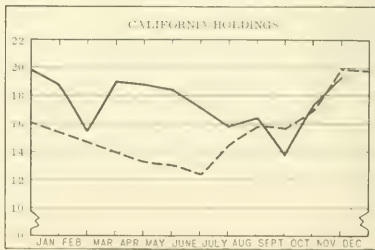
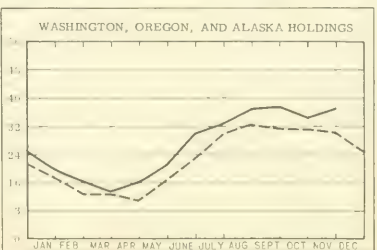
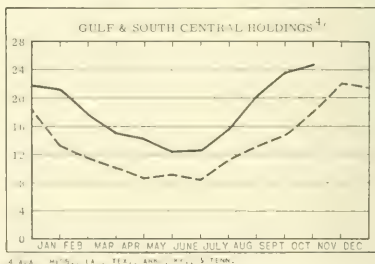
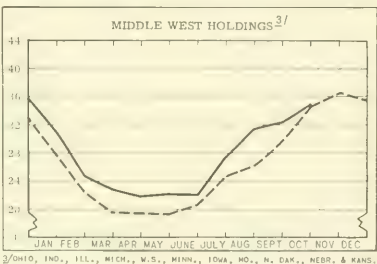
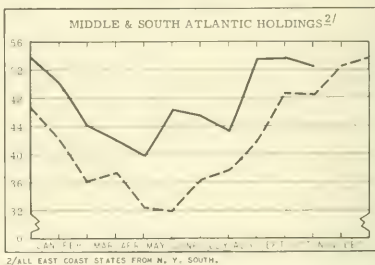
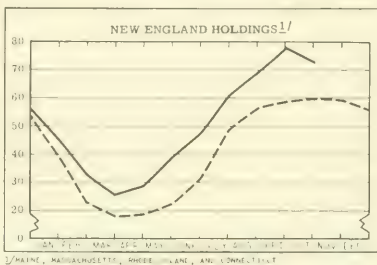
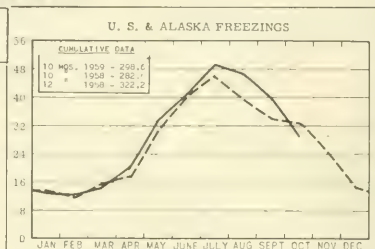
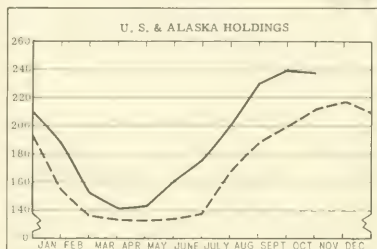


CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

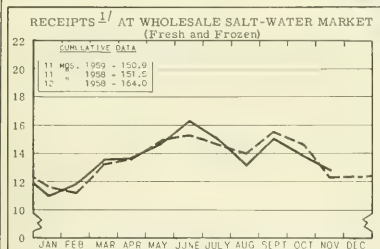
In Millions of Pounds



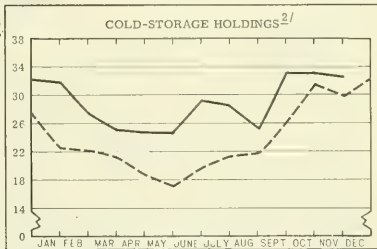
* Excludes salted, cured, and smoked products.

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

In Millions of Pounds

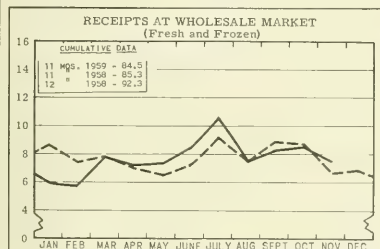


NEW YORK CITY

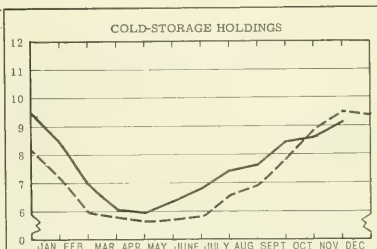


^{1/}INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.

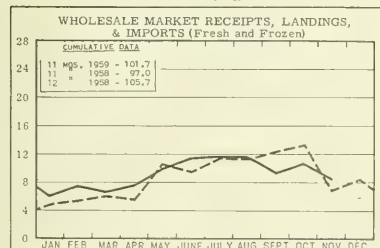
^{2/}AS REPORTED BY PLANTS IN METROPOLITAN AREA.



CHICAGO



SEATTLE



LEGEND:
 — 1959
 - - 1958
 . . 1957

BOSTON

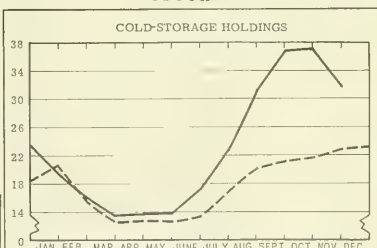


CHART 5 - FISH MEAL and OIL PRODUCTION - U.S. and ALASKA

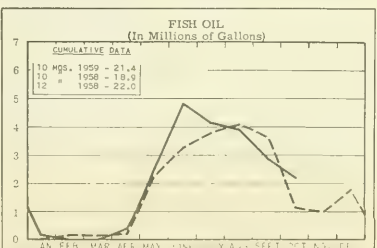
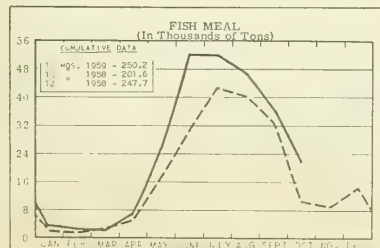
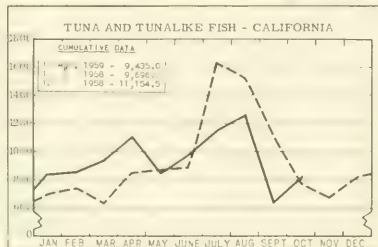
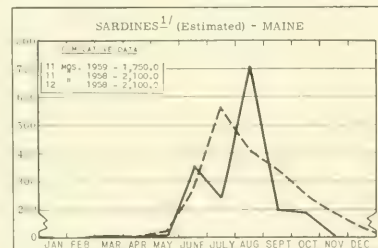
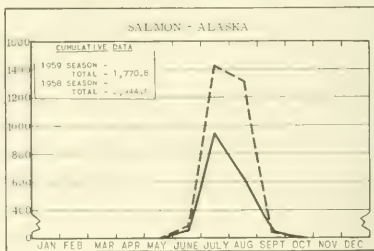
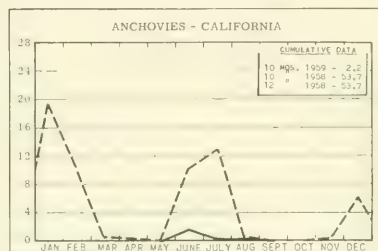
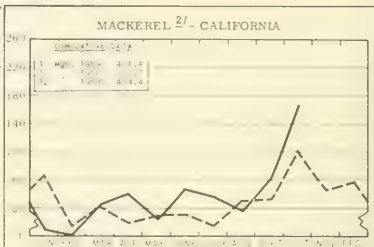


CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

In Thousands of Standard Cases



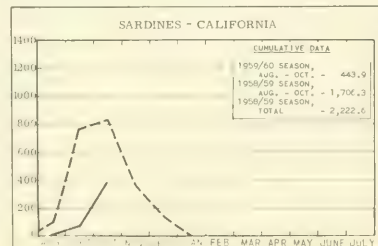
LEGEND:
— 1959
--- 1958



¹/₁ INCLUDING SEA HERRING.

STANDARD CASES

Variety	No. Cans	Designation	Net Wgt.
SARDINES.....	100	1 drawn	3 1/2 oz.
SHRIMP.....	48	--	5 oz.
TUNA.....	48	# 1 tuna	6 & 7 oz.
PILCHARDS...	48	# 1 oval	15 oz.
SALMON.....	48	1-lb. tall	16 oz.
ANCHOVIES...	48	1-lb.	8 oz.



LEGEND:
— 1959/60
--- 1958/59

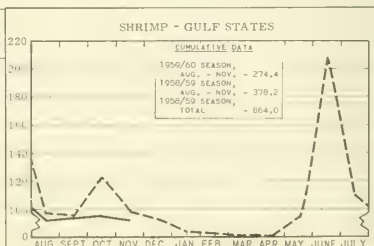
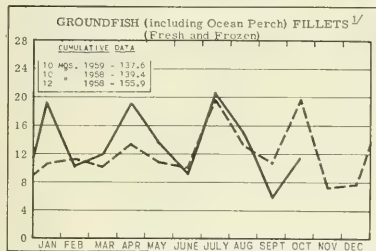


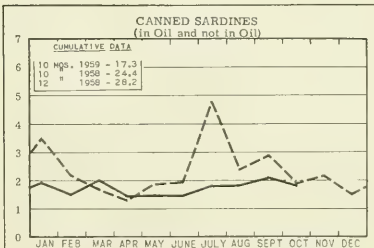
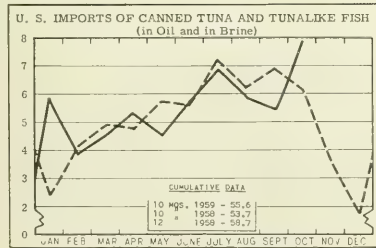
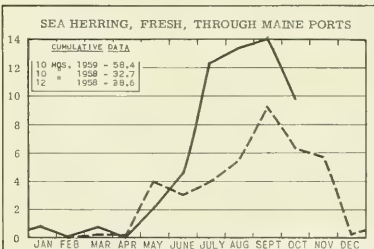
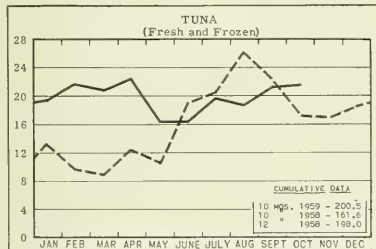
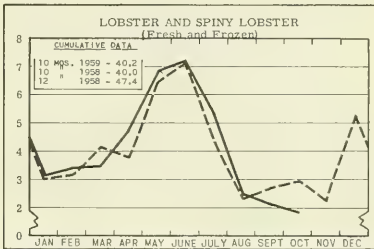
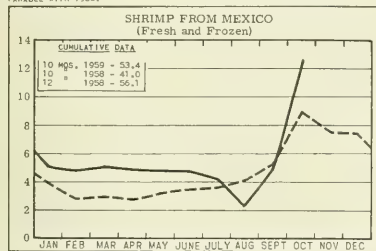
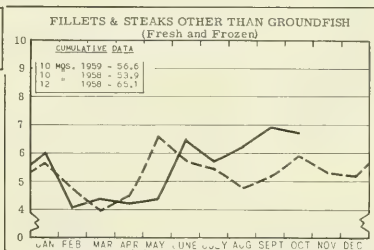
CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

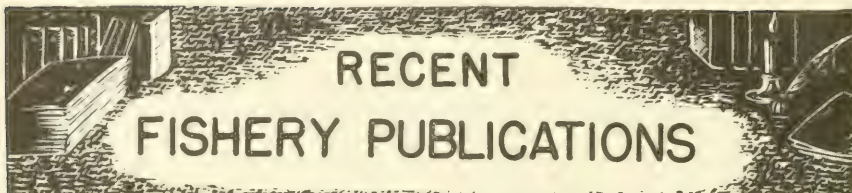
In Millions of Pounds



LEGEND:

— 1959
--- 1958





FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

- CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
- FL - FISHERY LEAFLET.
- SL - BRANCH OF STATISTICS LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
- SSR - FISHERY - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).
- SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

- | Number | Title |
|----------|---|
| CFS-2119 | - Ohio Landings, July 1959, 2 pp. |
| CFS-2120 | - New Jersey Landings, July 1959, 3 pp. |
| CFS-2129 | - Fish Meal and Oil, August 1959, 2 pp. |
| CFS-2130 | - North Carolina Landings, August 1959, 3 pp. |
| CFS-2132 | - Texas Landings, July 1959, 3 pp. |
| CFS-2137 | - Massachusetts Landings, July 1959, 5 pp. |
| CFS-2139 | - Rhode Island Landings, July 1959, 3 pp. |
| CFS-2141 | - Maine Landings, August 1959, 3 pp. |
| CFS-2142 | - Mississippi Landings, July 1959, 2 pp. |
| CFS-2145 | - New Jersey Landings, August 1959, 3 pp. |
| CFS-2146 | - Ohio Landings, August 1959, 2 pp. |
| CFS-2148 | - Frozen Fish Report, September 1959, 8 pp. |
| CFS-2150 | - South Carolina Landings, August 1959, 2 pp. |
| CFS-2151 | - Georgia Landings, August 1959, 2 pp. |
| CFS-2152 | - Florida Landings, August 1959, 7 pp. |
| CFS-2154 | - Shrimp Landings, June 1959, 6 pp. |
| CFS-2156 | - Alabama Landings, July 1959, 2 pp. |
| CFS-2157 | - Louisiana Landings, April 1959, 2 pp. |
| CFS-2160 | - Rhode Island Landings, August 1959, 3 pp. |
| CFS-2164 | - California Landings, May 1959, 4 pp. |
| CFS-2168 | - Louisiana Landings, May 1959, 2 pp. |
| CFS-2178 | - Fish Sticks and Portions, July-September 1959, 3 pp. |
| CFS-2196 | - Mississippi River Fisheries, 1958 Annual Summary, 7 pp. |
| CFS-2199 | - Lake Fisheries, 1958 Annual Summary, 11 pp. |
| FL-336pp | - Commercial Fisheries Outlook, October-December 1959, 46 pp., illus. |

Wholesale Dealers in Fishery Products (Revised):

- SL-3 - Massachusetts, 1959.
- SL-25 - Wisconsin (Great Lakes Area), 1959.
- SL-28 - Michigan (Great Lakes Area), 1959.
- SL-30 - Pennsylvania (Great Lakes Area), 1959.
- SL-42 - Kentucky (Mississippi River and Tributaries), 1959.

Firms Canning, 1958 (Revised):

- SL-108 - Salmon Eggs for Bait.
- SL-109 - Caviar and Fish Roe.
- SL-110 - Oysters.
- SL-116 - Food for Animals, From Marine Animal Products.
- SL-117 - Pacific Sea Herring.
- SL-118 - Groundfish Flakes.
- SL-119 - Squid.
- SL-120 - Anchovies.

Firms Manufacturing, 1958 (Revised):

- SL-151A - Fish Solubles and Homogenized Condensed Fish.
- SL-152 - Oyster Shell Products.
- SL-153 - Fish Glue.
- SL-154 - Seaweed Products.
- SL-155 - Marine Pearl Shell Buttons.
- SL-156 - Pearl Essence.
- SL-159 - Fresh-Water Mussel-Shell Products.

SSR-Fish. No. 294 - Progress Report on Alaska Fishery Management and Research, 1958, 32 pp., illus., June 1959. A review of the work of the U. S. Bureau of Commercial Fisheries in assisting the Alaska fisheries during 1958. One section describes activities in the Alaska salmon fishery by regions. Another section summarizes progress in the marine fisheries, with details on the herring, crab, shrimp, and clam industries. The inside back cover shows statistical tables on the Alaska canned salmon pack for 1958. Principal mission of the Bureau in Alaska is to achieve maximum sustained production of fishery products by maintaining the presently-fished populations at highest levels and bringing into production species not now being utilized, say the authors in summary.

SSR-Fish. No. 308 - Survey of the United States Shrimp Industry, Volume II, 176 pp., illus., June 1959. Shrimp supplies for the anticipated increase in future consumption will depend on their continued abundance in waters presently fished, on the discovery of new fishing grounds, and on expanded imports, according to this report. Among the topics covered by volume II are trends in distribution of shrimp; market channels; market agents; a survey of wholesale and retail distribution; packaging, storage, transportation, and quality preservation and control of shrimp; market communications; consumption patterns; nutritive value; statistics on apparent consumption; and ex-vessel, wholesale, and retail prices. The final chapter presents conclusions and recommendations aimed at the future well-being of the industry. The first volume provides a comprehensive examination of shrimp grounds, vessel construction, fishing operations, processing plant efficiency, and processing costs (SSR-Fish. No. 277).

SSR-Fish. No. 310 - Northeastern Pacific Albacore Survey, Part I--Biological Observations, by Joseph J. Graham, 36 pp., illus., July 1959.

Dep. No. 570 - Second World Fishing Boat Congress: Part I--Observations of a United States Government Fishery Methods and Equipment Specialist; Part II - Observation of a United States Government Fishery Technologist; and Part III - Fish Quality Stressed.

Dep. No. 571 - An Economic and Financial Study of the Fluke Otter-Trawl Fishery of New Jersey.

Dep. No. 572 - A Report to the Shellfish Industry.

Dep. No. 573 - Equipment Note No. 2--Pacific Coast Drum Trawling.

Alaska Fisheries Briefs, Fish and Wildlife Circular 59, 21 pp., illus., processed, September 1959. A collection of articles intended to acquaint the fishing industry of Alaska and neighboring regions with some of the aspects and preliminary results of investigations which are being undertaken by the Bureau of Commercial Fisheries and its contractors in Alaska. Includes the following: "Pink Salmon Migrations Along the Alaska Peninsula," by Fredrik V. Thorsteinson; "Salmon Migrations in Southeastern Alaska," by Wallace H. Noerenberg; "The Unexpected Appearance of Pink Salmon in the Kvichak River," by Clarence D. Becker; "Gravel Removal and the Fisheries," by Robert McVey; and "Estimating Abundance of Salmon Fingerling," by Howard S. Sears.

Galveston Biological Laboratory Fishery Research (for the year ending June 30, 1959), Circular 62, 130 pp., illus., processed, September 1959. Summarizes the research work accomplished at the Galveston Biological Laboratory during the last fiscal year. Describes in detail investigations on the shrimp fishery, estuarine ecology, industrial fishery, and red tide; effects of engineering projects; and special projects such as the bait shrimp fishery of Galveston Bay, seasonal barnacle attachment in East Lagoon, and the Gulf V plankton sampler. Of particular interest is the assessment of the value and extent of the industrial fishery. The rapid expansion of this fishery will aid the industry by providing off-season raw material and employment to the menhaden fishery and by utilizing the fishing capacity of shrimp trawlers during periods of shrimp scarcity.

Progress in Sport Fishery Research, 1957-58. Circular 57, 92 pp., illus., processed. Sport fishery research is concerned with fish propagation research such as trout and salmon culture, and warm-water fish propagation; fishery management research on public waters, like those of the National Park Service which have been used as outdoor laboratories for studies of lake and stream productivity and experimental management techniques; and research on environmental influences which affect the welfare of the fish. This report discusses progress during 1957-58 on fish management research, fish disease research, fish nutrition research, and research on fish cultural methods.

THE FOLLOWING MARKET NEWS LEAFLETS ARE AVAILABLE FROM THE BRANCH OF MARKET NEWS, BUREAU OF COMMERCIAL FISHERIES, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C.

Number	Title
MNL-1	Cuba's Fishing Industry, 1958, 10 pp.
MNL-2	List of Ship Owners and Operators in Peru's Fishing Industry, 5 pp.
MNL-3	Legislative Actions Affecting Commercial Fisheries, 86th Congress, 1st Session, 7 pp.

THE FOLLOWING ENGLISH TRANSLATIONS OF FOREIGN LANGUAGE ARTICLES ARE NOT FOR GENERAL DISTRIBUTION BUT ARE AVAILABLE FOR REFERENCE ONLY FROM THE U. S. FISH AND WILDLIFE SERVICE, BUREAU OF COMMERCIAL FISHERIES, P. O. BOX 3630, HONOLULU, HAWAII.

A Population Study on the So-Called Makajiki (Striped Marlin) of Both Northern and Southern Hemispheres of the Pacific, I--Comparison of External Characters, by Tadao Kamimura and Misao Honma, English translation, 6 pp., processed. (Translated from Report of the Nankai Regional Fisheries Research Laboratory, no. 8, March 1958, pp. 1-11.)

A Population Study on the So-Called Makajiki (Striped Marlin) of Both Northern and Southern Hemispheres of the Pacific, II--Fishing Conditions in the Southern Hemisphere, by Misao Honma and Tadao Kamimura, English translation, 12 pp., processed. (Translated from Report of the Nankai Regional Fisheries Research Laboratory, no. 8, March 1958, pp. 12-21.)

Studies on the Albacore, V--The Fishing Condition and Size of Albacore Taken in the South Pacific Ocean, by Misao Honma and Tadao Kamimura, English translation, 8 pp., processed. (Translated from Report of Nankai Regional Fisheries Research Laboratory, no. 6, March 1957, pp. 84-90.)

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED:

(Baltimore) Monthly Summary - Fishery Products, June, July, and August, 1959; 6, 6, and 7 pp., respectively. (Market News Service, U. S. Fish and Wildlife Service, 400 E. Lombard St., Baltimore 2, Md.) Receipts at Baltimore by species and by states and provinces for fresh- and salt-water fish and shellfish; and total receipts by species and comparisons with previous years; for the months indicated.

California Fishery Products Monthly Summary, August 1959; September 1959; 13 pp. each. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) California cannery receipts of tuna and tunalike fish, mackerel, and anchovies; pack of canned tuna, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; American Tuna Boat Association auction sales; for the months indicated.

(Chicago) Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Market Prices, August 1959, 15 pp. (Market News Service, U. S. Fish and Wildlife

Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces for fresh- and salt-water fish and shellfish; wholesale prices for fresh and frozen fishery products; and United States Great Lakes production, 1958 for the month indicated.

Gulf Monthly Landings, Production, and Shipments of Fishery Products, September 1959, 6 pp. (Market News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; sponge sales; and fishing imports at Port Isabel and Brownsville, Tex., for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, September and October, 1959; 4 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 18 So. King St., Hampton, Va.) Fishery landings and production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the months indicated.

New England Fisheries--Monthly Summary, September 1959, 22 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Reviews the principal New England fishery ports, and presents food fish landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, Provincetown, and Woods Hole), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and landings and ex-vessel prices for fares landed at the Boston Fish Pier and sold through the New England Fish Exchange; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly Summary for July and August 1959, 21 and 20 pp., respectively. (Market News Service, 155 John St., New York 38, N. Y.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, imports entered at New York City, primary wholesaler prices for frozen products, and marketing trends; for the months indicated.

(Seattle) Washington, Oregon, and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, September 1959, 9 pp. (Market News Service, U. S. Fish and Wildlife Service, Pier 42 South, Seattle 4, Wash.) Includes landings and local receipts, with ex-vessel and wholesale prices in some instances, as reported by Seattle and Astoria (Oreg.) wholesale dealers; also Northwest Pacific halibut landings; and Washington shrimp landings; for the month indicated.

Shrimp Marketing at Chicago--Receipts, Wholesale Prices, and Trends, 1940-58, by G. A. Albano, 37 pp., processed. (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) A review of shrimp marketing at Chicago including receipts for the years 1940-58 and wholesale prices since 1948. An analysis of trends and developments in shrimp marketing prefaces the statistical part of the report. Data covering a 10-year period on cold-storage holdings, United States shrimp landings by areas, imports, availability and disposition of shrimp supplies, and other information are shown. The report also includes a reprint of the United States standards for grades of frozen raw breaded shrimp.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Age and Growth of the Redfish (SEBASTES MARINUS) in the Gulf of Maine, by George F. Kelly and Robert S. Wolf, Fishery Bulletin 156 (From Fishery Bulletin of the Fish and Wildlife Service, vol. 60), 35 pp., illus., printed, 30 cents, 1959. The primary objective of this paper is to present age-growth information on the redfish or ocean perch population of the Gulf of Maine. This information was needed for the intelligent planning of a research program concerned with determining how this valuable fishery should be managed. Validity of the use of the otolith in age-growth studies of the redfish is demonstrated. According to the report, otoliths accrue one opaque and one hyaline band a year. The opaque band begins to form in April, the hyaline band in September. Otoliths preserved in ethanol may be read whole, although those from larger fish are more easily read after they are sectioned. Otoliths stored dry must be sectioned for reading. Redfish larvae can be collected in surface waters throughout the period of spawning, April to September. The fry descend into mid-depths as they grow and first appear on the bottom in August. Redfish reach an average length of about 50 mm. in their first year of life. The sexes grow at virtually the same rate until the tenth year, after which the male grows more slowly than the female. Redfish of the Gulf of Maine grow more slowly than those of northern European waters. While dominant age classes appear in the collections of young fish, they are not obvious in samples of older, commercially available fish.

Effects of Fertilizing Bare Lake, Alaska, on Growth and Production of Red Salmon (O. NEKA), by Philip R. Nelson, Fishery Bulletin 159 (From Fishery Bulletin of the Fish and Wildlife Service, vol. 60), 31 pp., illus., printed, 25 cents, 1959.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ALABAMA:

An Economic Evaluation of the Commercial Fishing Industry in the T. V. A. Lakes of Alabama

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

during 1956, by Paul Bryan and C. E. White, Jr., Contribution No. 116, 5 pp., printed. (Reprinted from Proceedings of the Twelfth Annual Conference, Southeastern Association of Game and Fish Commissioners, pp. 128-132.) Southeastern Association of Game and Fish Commissioners, Columbia, S. C., 1958.

ALGAE:

An Introductory Account of the Smaller Algae of British Coastal Waters: Part I--Introduction and Chlorophyceae, by R. W. Butcher, Fishery Investigations Series IV, 91 pp., illus., printed. £1 5s (about US\$3.51). Her Majesty's Stationery Office, York House, Kingsway, London W. C. 2, England, 1959. Covers methods of investigation, laboratory culture, taxonomic features, classification, ecology and distribution, and taxonomy of motile, unicellular algae found in inshore waters of the British Isles. "Even a preliminary examination of the community of minute colored organisms has revealed new structures and new species of outstanding importance in the phylogeny of certain groups. Some have been shown to produce toxic compounds. . . others might be of value in the general nutrition of animals, . . ." states the author.

AMINO ACIDS:

"The Amino-Acid Composition of Some British Food Fishes," by J. J. Connell and P. F. Howgate, article, Journal of the Science of Food and Agriculture, vol. 10, April 1959, pp. 241-244, printed. The Society of Chemical Industry, 14 Belgrave Square, London S. W. 1, England.

ANGOLA:

Subsidio para um Catalogo dos Nomes Vernaculos dos Peixes Marinhos de Angola (Supplementary Catalogue of Common Names of Marine Fishes of Angola), by Pedro da Franca, Notas Mimeografadas de Centro de Biologia Piscatoria (Mimeographed Notes from the Fishery Biology Center) no. 5, 1959, 38 pp., processed in Portuguese. Ministerio do Ultramar, Rua Dr. Antonio Candido, 9, Lisbon, Portugal.

ANTIBIOTICS:

Experiments in the Use of Antibiotics in Fish Preservation, by J. M. Shewan and J. Stewart, D. S. I. R. Food Investigation Memoir No. 1203, 15 pp., printed. Department of Scientific and Industrial Research, Charles House, 5-11 Regent St., London S. W. 1, England, 1958.

"Inhibition of Bacteria from Marine Sources by Aureomycin," by N. K. Velankar, article, Proceedings of the Indian Academy of Sciences, vol. 47B, 1958, pp. 87-96, printed. Indian Academy of Sciences, Bangalore, India.

BACTERIOLOGY:

"Bacteriology," article, Food Investigations 1957 (Report of the Food Investigation Board--Great Britain), pp. 21-23, printed. Department of Scientific and Industrial Research, Charles House, 5-11 Regent St., London S. W. 1, England, 1958. Reports the results of bacteriological examination of fresh and spoiling iced fish, ice used in chilling of fish, fish after han-

ling, and fish fillets. The study covers young cod caught in the waters of the Faroes and the North Cape and discusses types of organisms found and their frequencies.

Studies of FLAVOBACTERIUM PISCICIDA Bein I--Growth, Toxicity, and Ecological Considerations, by Samuel P. Meyers, Morris H. Baslow, Selwyn J. Bein, and C. Edith Marks, 6 pp., illus., printed. (Reprinted from Journal of Bacteriology, vol. 78, no. 2, August 1959, pp. 225-230.) Journal of Bacteriology, Williams and Wilkins Co., 428 E. Preston St., Baltimore 2, Md.

BIBLIOGRAPHIES:

Bibliography of Theses on Fishery Biology, by Robert M. Jenkins, 83 pp., processed, \$1. Sport Fishing Institute, Bond Bldg., Washington, D. C. A compilation of graduate theses on fishery biology and related subjects. Includes a short section on commercial fisheries.

BIOCHEMISTRY:

Studies on pH of Fish Muscle--Variation in pH of Fresh Albacore Muscle on the Locality Examined (Studies on the Tuna Meat--I), by Toshikazu Kawabata and others, 9 pp., illus., printed in Japanese with English abstract. (Reprinted from Bulletin of the Japanese Society of Scientific Fisheries, vol. 18, no. 3, August 1952, pp. 124-132.) Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

BRAZIL:

Notas Sobre o Crescimento, o Tubo Digestivo e a Alimentacao da Gitubarana, SALMINUS HILARI Val., 1829 (Notes on the Growth, Digestive Tract, and Food of Salminus hilari Val., 1829), by Melquiades Pinto Paiva, 23 pp., illus., printed in Portuguese. National Museum of the University of Brazil, Rio de Janeiro, D. F., Brazil.

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"Experience and Methods of Controlling Odors Associated with Fish Byproducts Plant at Gloucester," by Leonard D. Mandell, article, Journal of Boston Society of Civil Engineers, vol. 45, 1958, pp. 366-368, printed. Boston Society of Civil Engineers, 88 Tremont Temple, Boston, Mass.

"Fish Byproducts," article, Food Investigation 1957 (Report of the Food Investigation Board--Great Britain), pp. 21-22, printed. Department of Scientific and Industrial Research, Charles House, 5-11 Regent St., London S. W. 1, England, 1958. Discusses the value of fish meal as an ingredient in animal feed and some of the technological problems encountered in its production. Reports on the need for valid quality assessment tests; progress in the identification of chemical components of offensive odors; and results of experimental work done at a fish-meal pilot plant.

CALIFORNIA:

California Fish and Game, vol. 45, no. 4, October 1959, 141 pp., illus., printed. Department of Fish and Game, 722 Capitol Ave.,

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Sacramento 14, Calif. Includes, among others, the following articles: "California Sturgeon Tagging Studies," by Harold K. Chadwick; "The Use of Probability Sampling for Estimating Annual Number of Angler Days," by Norman Abramson and Joyce Tolladay; and "Striped Bass Introduced into the Colorado River," by J. A. St. Amant.

CANADA:

Canadian Fisheries Annual, Vol. 8, 1959, 128 pp., illus., printed. National Business Publications, Ltd., Gardenvale, Quebec, Canada. Includes these feature articles: "Canada's Fisheries in 1958," by Mark Ronayne; "World Fisheries in 1958," by D. B. Finn; "Canadian Fisheries Research in 1958," by J. L. Kask; and "Trends and Developments in Fishery Package Design," by Leonard Arthur Wheeler. In addition, special sections contain complete statistics of Canada's commercial fisheries, a directory of fishing companies and their products, buyer's guide, and a list of Federal and Provincial Government fishery officials.

Fisheries Statistics of Canada (Nova Scotia), 1957, 65 pp., printed in French and English, C\$1. Queen's Printer and Controller of Stationery, Ottawa, Canada, September 1959. Consists of tables giving the quantity and value of fish and shellfish landed in Nova Scotia, 1939-1957; the quantity and value of fishery products by species and fisheries districts, 1956-1957; and capital equipment employed and number of persons engaged in the primary operations by fisheries districts, 1956-1957.

"The Freshwater Fisheries of Manitoba," by J. E. Steen, article, Trade News, vol. 12, no. 3, September 1959, pp. 8-10, illus., printed. Director of Information and Educational Service, Department of Fisheries, Ottawa, Canada. Although often considered an exclusively agricultural province, Manitoba possesses an important fresh-water fishery, with 5,000-6,000 fishermen landing about 30 million pounds of fish annually, valued at 5-7 million Canadian dollars. Of 75 different species inhabiting the province's lakes and rivers, 15 are of commercial importance. These include principally pickerel, whitefish, sauger, pike, and tullibee. Supervision and inspection of the fishery is maintained by Provincial and Federal agencies.

Progress Reports of the Pacific Coast Stations, no. 113, 18 pp., illus., printed. Fisheries Research Board of Canada, Ottawa, Canada, September 1959. Among the articles included are: "The Use of Condensed Herring Solubles in Turkey Poul Ratons," by B. E. March and others; "Observations on Adult Pink Salmon Behaviour" and "Note on the Behaviour of Pink Salmon Fry," by W. Percy Wickett; "The Occurrence of Lesser Lancelet Fish (*Anotopterus pharao* Zugmayer) in the Northeast Pacific Ocean," by G. T. Taylor; and "The Primary Productivity and Fertility of the Northeast Pacific and the British Columbia Coastal Waters," by J. D. H. Strickland.

CANNED FISH:

Crystals in Canned Sea Foods and Fish, by C. A. Greenleaf and R. P. Farrow, Circular 18-L Revised, 4 pp., printed. Washington Research Laboratory, National Canners Association, 1133 20th St., N. W., Washington, D. C., September 1959. Discusses the occasional appearance in canned fishery products of crystals of magnesium ammonium phosphate hexahydrate, or struvite. These crystals are harmless, odorless, and tasteless and are formed after canning from substances naturally present in the fish. Identification can easily be made since the struvite crystals are soft and can be dissolved by boiling in vinegar or lemon juice.

CHILLING AND FREEZING:

"Research on Chilling and Freezing of Fish," by Af. F. Bramsnaes, article, Saettryk af Kulde Dansk Kølleteknisk Tidsskrift, vol. 12, no. 6, 1958, pp. 61-64 and vol. 13, no. 1, 1959, pp. 5-9, printed in Danish. Fiskeriministeriets Forsøgslaboratorium, Copenhagen, Denmark.

COD:

"Dos Brotes de Envenenamiento por Consumo de Bacalao Salado en Puerto Rico" (Two Cases of Poisoning from Eating Salted Codfish in Puerto Rico), by A. T. Masi and others, article, Boletín de la Oficina Sanitaria Panamericana, vol. 46, no. 5, May 1959, pp. 465-471, printed in Spanish with English summary. Pan American Health Organization, 1501 New Hampshire Ave., N. W., Washington, D. C.

"The Technological Characteristics of the Baltic Sea Codfish," by P. M. Pozhagina, article, Izvestia Akademii Nauk Latvskoi, no. 3, 1954, pp. 85-91, printed in Russian. Latvijas Padomju Sociālistiskās Republikas Zinatnu Akadēmija, Riga, Latvia.

CONSERVATION:

Environmental Conservation, by Raymond F. Dasmann, 307 pp., illus., printed, \$6.50. John Wiley & Sons, Inc., 440 4th Ave., New York 16, N. Y., 1959.

The Status of Legal Restrictions in Fish Conservation, by R. W. Eschmeyer, 8 pp., printed. (Reprinted from Proceedings 38th Convention, International Association of Game, Fish and Conservation Commissioners, 1949.) Tennessee Valley Authority, Norris, Tenn., 1949.

DENMARK:

Fiskeriberetning for Året 1958 (The Ministry of Fisheries Annual Report for 1958), 151 pp., illus., printed in Danish with English summary. Fiskeriministeriet, 1 Kommission Hos G. E. C. Gad, Copenhagen, Denmark. A report on the Danish fishing industry for the year 1958. Includes data on number of fishermen employed; fishing vessels; gear and nets; landings of fish and shellfish; trout produced in ponds; production of canned, smoked, and filleted fish; production of fish meal and oil; and foreign trade in fishery products.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

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Deodorization and Storage of Fish, Shellfish, and Meat, by Seiji Tada, Japanese Patent No. 1583, March 7, 1958, printed. Japanese Patent Office, Tokyo, Japan.

DIRECTORIES:

Scandinavian Fishing Year-Book, 1958-59 (Year-Book and Directory for the Fish Trade), edited by Jorgen Frimodt, 416 pp., illus., printed, 50 kroner (US\$7.50). Jorgen Frimodt, 59-61 Nyhavn, Copenhagen K, Denmark. A well-organized and useful handbook for the international fishing trade. Contains chapters on the world catch and production of fish and shellfish, European fishing in the Atlantic, fish names in various languages together with their scientific names, seal hunting in the Arctic, and world whaling. Sections on Denmark, Faroe Islands, Norway, Sweden, Finland, Iceland, Germany, Netherlands, Belgium, and United Kingdom contain articles on the fisheries, addresses of embassies and legations, names of importing and exporting firms, lists of builders and repair yards for fishing craft, and other trade data. Included are lists of importers and exporters throughout the world. The appendix contains a list of port-distinguishing letters of fishing vessels and a directory of individual vessels under registry of the above-mentioned countries, also contains a large map of fishing banks and ports of the North Atlantic.

ELECTRICAL FISHING:

"The Electric Mid-Water Trawl", by Jay Russell, article, Maine Coast Fisherman, vol. 13, June 1959, p. 12, printed. Maine Coast Fisherman, 22 Main St., Camden, Me.

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"Enzymes Process Fish", article, Chemical and Engineering News, vol. 37, April 13, 1959, p. 27, printed. Chemical and Engineering News, American Chemical Society, 1801 K St., N. W., Washington 6, D. C.

FISH CULTURE:

"The Significance of Fish Culture as an Integral Part of Rural Economy in Indonesia", by M. Ahjar and R. Tasripin, paper, Proceedings Indo-Pacific Fisheries Council, 6th Session, September 30-October 14, 1955, Section II, pp. 303-306, printed. Food and Agriculture Organization of the United Nations, Regional Office for Asia and the Far East, Bangkok, Thailand, 1956.

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FISH LIVER OIL:

Deodorization of Fish-Liver Oil, by Masakuni Kanai, Japanese Patent No. 3632, May 12, 1958, printed. Japanese Patent Office, Tokyo, Japan.

FISH MEAL:

"The Effect of Prolonged Heating on Various Nutritive Factors in Fish Meal", by A. N. Rowan, article, Annual Report, Fishing Industry Research Institute, April-December 1956, no. 10, pp. 28-29, printed. Fishing Industry Research Institute, Cape Town, Union of South Africa, 1957.

"New Fish Meal Tested in Broiler Rations", by Elbert J. Day and James E. Hill, article, Poultry Science, vol. 38, May 1959, pp. 556-559, printed. Poultry Science Association, Kansas State College, Manhattan, Kans.

"The Origin and Elimination of Offensive Odours in Fish Meal Production", by Hans H. Kummeler, article, The South African Shipping News and Fishing Industry Review, vol. 14, no. 9, September 1959, p. 53, printed. Odhams Press, South Africa (Pty.) Ltd., Box 2598, Cape Town, Union of South Africa. Discusses the causes of offensive odors produced during the manufacture of fish meal and the ineffectiveness of the present method of elimination by water scrubbing. The author describes a new process which involves precipitation of the undesirable substances by means of mixing with boiler fluegases.

FISH OILS:

"The Fungicidal Activity of the Unsaturated Fatty Acids and Quaternary Salts Prepared from Fish Oils", Boris Sokoloff and others, article, Journal of the American Oil Chemists' Society, vol. 36, June 1959, pp. 234-237, printed. The American Oil Chemists' Society, 35 E. Wacker Dr., Chicago 1, Ill.

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Reconnaissance Survey of the Bathymetry of the Straits of Florida, by Violet B. Siegler, Technical Report no. 59-3, 12 pp., illus., processed. The Marine Laboratory, University of Miami, #1 Rickenbacker Causeway, Miami 49, Fla., 1959.

Straits of Florida Physical and Chemical Data, May 1957-November 1958, by M. P. Wennekens and others, Technical Report 58-5, 83 pp., illus., processed. The Marine Laboratory, University of Miami, #1 Rickenbacker Causeway, Miami 49, Fla., 1958.

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Current Bibliography for Aquatic Sciences and Fisheries (Supplementary References to 1957 Publications Not Previously Included), 324 pp., processed. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, 1959.

FAO Picture Sheet No. 9—Fishing Boats, 2 pp., illus., printed. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy. A poster-size sheet showing photos of fishing vessels in many countries. The theme of the text is "The Better Boat, the Greater the Catch," and describes the technical problems met by FAO experts in efforts to improve the fisheries in a number of undeveloped nations.

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Fishing Gear Used in Spanish Coastal Lagoons, by Fernando Lozano Cabo, General Fisheries Council for the Mediterranean, Studies and Reviews No. 9, November 1959, 35 pp., illus., processed. GFCM Secretariat, Food and Agriculture Organization of the United Nations, Rome, Italy. This study was originally presented at the Fifth Meeting of the General Fisheries Council for the Mediterranean, Rome, October 13-18, 1958, as technical paper no. 26. Describes fishing methods as practiced in fresh- and salt-water lagoons in Valencia, Murcia, Galicia, and other parts of Spain. The small section of text is followed by a large number of prints reproducing both contemporary photos and some quaint wood-cuts taken from Historical Dictionary of National Fishing Gear, by Antonio Safer Reguart, published between 1791 and 1795 in Madrid. Types of gear include seines, sardine gill nets, trammel nets, cast nets, shrimp nets, eel spears, clam dredges, eel traps, permanently-installed traps made of reeds, and eel tanks.

Report of the Technical Meeting on Costs and Earnings of Fishing Enterprises, 8-13 September 1958, 195 pp., processed. Economics and Statistics Branch, Fisheries Division, Food and Agriculture Organization of the United Nations, Rome, Italy. Includes proceedings, papers presented, and discussions held under each of five agenda items covered during a meeting of qualified experts in fishery economics held in London. The agenda items consisted of: purposes of cost and earnings studies in fisheries—the point of view of government and other public authorities and those in the fishing industry; concepts, definitions, and conventions in different countries, and general conclusions; merits of different kinds of investigational methods; methods of analysis of collected accounts; and effect of regulation of the fisheries on costs and earnings of fishing enterprises.

FREEZING:

"Fish Freezing: Methods and Equipment in Commercial Use," by Joseph W. Slavin, article, Industrial Refrigeration, vol. 137, no. 3, September 1959, pp. 18-19, 22-24, illus., printed. Industrial Refrigeration, Nickerson & Collins Co., 433 N. Waller Ave., Chicago 44, Ill. Reviews current methods of freezing, handling, storage, and packaging of the 350 million pounds of frozen fishery products produced in the United States annually. "Differences in the composition of the various species of fish harvested in the United States, and the differences in marketing requirements have necessitated consideration of the specific individual product in the selection of packaging materials and in the design and application of equipment for freezing and cold storage," states the author in summary.

"Freezing and Cold-Storage," article, Food Investigation 1957, pp. 10-12, printed. Department of Scientific and Industrial Research, Charles House, 5-11 Regent St., London S. W. 1, England, 1958.

FRESH-WATER FISH:

"Some Young Fresh-Water Fishes of New York," by Edward C. Raney, article, The New York

State Conservationist, vol. 14, no. 1, Aug.-Sept. 1959, pp. 22-28, illus., printed, single copy 50 cents. The Conservationist, Room 335, State Campus, Albany, N. Y. Describes the early stages in the life history of some of New York's fresh-water fish: the pike family, eel, bullhead, sucker, white perch, carp, yellow perch, and pike perch. The bass family, smelt, shad, sheepshead, striped bass, salmon, and trout are also described.

GROUND FISH:

A Report on Dehydrated Ground Fish, by William A. Snyder, 2 pp., printed. (Reprinted from American Fur Breeder, April 1959, pp. 14, 44.) American Fur Breeder, Fur Farm Publications, 405 E. Superior St., Duluth, Minn.

HALIBUT:

Regulation and Investigation of the Pacific Halibut Fishery in 1958, no. 27, 20 pp., illus., printed. International Pacific Halibut Commission, Seattle, Wash., 1959. A brief report of the accomplishments of the Commission during 1958 covering its historical background, activities during the year, 1958 regulations, statistics of the fishery, catch per unit of fishing effort, composition of the catches, growth studies, tagging experiments, and studies of halibut below commercial size.

HERRING:

"Om Bestanden av Atlanto-Skandisk Sild" (On Ocean Supply of Atlantic and Scandinavian Herring), by J. J. Marti, article, Fiskets Gang, vol. 45, no. 38, September 17, 1959, pp. 522-523, illus., printed in Norwegian. Fiskets Gang, Postgiro Nr. 691 81, Bergen, Norway.

The Influence of Gibbing on the Ripening of Maates Cured Herring, by A. F. M. G. Luijpen, 91 pp., printed in Dutch with English summary. Jacob Catslaan 28, Driehuis (Velsen), The Netherlands, 1959.

"Sammenliknende Undersøkelser Vintersild-Seasonen 1959 over Fangstresultatene ved Bruk an Snurpenøter av Kunstfibre (Nylon/Terylene) Kontra Snurpenøter av Bomull" (Comparison of Research on Winter Herring Catch 1959 Season with Use of Purse Seine of Synthetic Fiber Against Purse Seine of Cotton), article, Fiskets Gang, vol. 45, no. 40, October 1, 1959, pp. 550-558, printed in Norwegian. Fiskets Gang, Postgiro Nr. 691 81, Bergen, Norway.

"Vintersildfiskets Lønnsomhet 1958" (Production of Winter Herring Fishery 1958), by Georg Opedal, article, Fiskets Gang, vol. 45, no. 37, September 10, 1959, pp. 502-511, printed in Norwegian. Fiskets Gang, Postgiro Nr. 691 81, Bergen, Norway.

INTERNATIONAL GEOPHYSICAL YEAR:

The International Geophysical Year in Retrospect, by Wallace W. Atwood, Jr., Department of State Publication 6850, 8 pp., illus., printed, 10 cents. (Reprinted from the Department of State Bulletin, May 11, 1959.) Public Services Division, Bureau of Public Affairs, Department of State, Washington 25, D. C., July 1959. (For sale by

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the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.)

IRRADIATION PRESERVATION:

Experiments on the Irradiation of Fish with 4 Mev Cathode Rays and Cobalt Gamma Rays, by J. M. Shewan and J. Liston, D.S.I.R. Food Investigation Memoir No. 1204, 16 pp., printed, Department of Scientific and Industrial Research, Charles House, 5-11 Regent St., London S. W. 1, England. A paper presented at the Second United Nations International Conference on the Peaceful Uses of Atomic Energy, June 3, 1958.

"Production and Identification of a Green Pigment Formed During Irradiation of Meat Extracts," by J. B. Fox, Jr., Theodora Strehler, Carl Bernofsky, and B. S. Schweigert, article, *Journal of Agricultural and Food Chemistry*, vol. 6, September 1958, pp. 692-696, printed, *Journal of Agricultural and Food and Chemistry*, American Chemical Society, 1801 K St., N. W., Washington 6, D. C.

JAPAN:

Bulletin of the Faculty of Fisheries, Hokkaido University, vol. 10, no. 1, May 1959, 84 pp., illus., printed in Japanese with summaries in English. Faculty of Fisheries, Hokkaido University, Hakodate, Japan. Contains, among others, the following papers: "An Experiment on a Mid-Water Trawl. VI--Practical Fishing Experiment," by Kiichiro Kobayashi and Naonichi Inoue; "Studies on the Fishing Grounds," by Tatsusaki Maeda and others; "Biochemical Studies on Squid Meat Food Poisoning. III--The Effect of Amines of Squid Meat on the Activity of Human Serum Acetylcholinesterase," by Kiichi Murata and Atsushi Iida; "Studies on the Fishing Grounds," by Sakuzo Nishiyama and others; "Quality of Flatfish from Hakodate. Part 3--The Factors Deciding the Quality. 1--Relations Between the Quality and Features, Ecological and Morphological," by Keiichi Oishi; and "Chemical Studies on Marine Algae. XII--The Free Amino Acids in Several Species of Marine Algae," by Mitsuzo Takagi and Mitsuo Kuriyama.

Bulletin of the Faculty of Fisheries, Hokkaido University, vol. 10, no. 2, August 1959, 90 pp., illus., printed in Japanese with English abstracts. Faculty of Fisheries, Hokkaido University, Hakodate, Japan. Contains, among others, these articles: "Biochemical Studies on Squid Meat Food Poisoning. IV--The Inhibition of Human Serum Acetylcholinesterase by the Amines of Squid Meat, Beef, and Hog Flesh," by Kiichi Murata and Atsushi Iida; "Results of Fishing Experiments with Trinal Gill Nets," by Hideo Nakamura and Giichi Kawasaki; "Quality of Flatfish from Hakodate. Part 3--The Factors Deciding the Quality. (2) Relations Between the Quality and Ordinary Chemical Constituents," by Keiichi Oishi; and "Utilization Value of Fishes Caught Abundantly in Waters Around Hokkaido as Raw Material for Fish Jelly Products ('Kamaboko' or 'Chikuwa')--I," by Eiichi Tanikawa and Yutaka Fujii.

Statistic Tables of Fishing Vessels

(as of the end of 1958), General Report No. 11, 239 pp., illus., printed in Japanese and English. Japanese Fisheries Agency, Tokyo, Japan. An annual report containing data on the various types of Japanese fishing craft, both powered and nonpowered, as obtained by a fishery registration system. Statistical tables are shown by type of engine, type of fishery, and prefecture. According to the report, "statistics seem to show that the Japanese fishing fleet has not only restored its prewar status but increased its capacity rapidly after the War."

Tokai Regional Fisheries Research Laboratory,

8 pp., illus., printed. Tokai Regional Fisheries Research Laboratory, Tsukishima, Chuo-ku, Tokyo, Japan, 1958.

KELP:

"Kelp, Giant Among the Algae," by Hazel Mohler, article, *Nature Magazine*, vol. 52, no. 8, October 1959, pp. 406-408, illus., printed. American Nature Association, 1214 16th St., N. W., Washington 6, D. C. A clear exposition of the natural history and practical uses for the *Macrocystis*, *Nereocystis*, and other common forms of kelp which grow so plentifully along our Pacific Coast. The *Macrocystis* is not only the longest of all known plants, sometimes attaining a length of 1,000 feet, but it also acts as a natural buoy to warn vessels of nearby shoal water. A reportedly succulent pickle can be made from the *Nereocystis*. Kelp of various types, formerly harvested for its iodine content, is now used in the manufacture of sodium alginate, a gelatinous binder and emulsifying agent, agricultural fertilizers and animal feeds. And in nature, kelp not only provides food for countless aquatic animals but also purifies the waters and enhances the oxygen supply.

KENTUCKY:

Annual Report, Department of Fish and Wildlife Resources, Fiscal Year 1952-53, 13 pp., processed, Department of Fish and Wildlife Resources, Frankfort, Ky.

KENYA:

Report on Kenya Fisheries, 1958, 20 pp., printed, 2s (about 28 U. S. cents). Ministry of Forest Development, Game and Fisheries, Fisheries Division, Nairobi, Kenya, 1959. Reviews the work done on inland fisheries development, a fish culture farm, a trout hatchery, and the trout rivers. The section on sea fisheries covers fresh, frozen, and chilled fish; marketing and cold storage; retail facilities; dried fish; green turtles; and crawfish. Fishing investigations and gear development are discussed and several tables on imports and catch statistics are included.

LAW OF THE SEA CONFERENCE:

United Nations Conference on the Law of the Sea, A/CONF.13/37, vol. I: Preparatory Documents (Geneva, Feb. 24-Apr. 27, 1958), 340 pp., printed, US\$3.50, Apr. 1959, (Sales No.: 58.V.4, Vol. I). United Nations, New York, N. Y. (For sale by International Documents Service, Columbia University Press, 2960 Broadway, New York 27,

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

N. Y.) Includes information on economic development of fisheries; comments by governments on law of the sea; fishing methods; and territorial waters.

MARINE RESEARCH:

The Airplane as an Instrument in Marine Research. Part One: Dinoflagellate Blooms, by Robert M. Ingle, Robert F. Hutton, Harry E. Shafer, Jr., and Robert Goss, Special Scientific Report No. 3, 27 pp., illus., processed, Florida State Board of Conservation, Marine Laboratory, St. Petersburg, Fla., September 1959.

NEW ZEALAND:

Report on Fisheries for 1958, 41 pp., printed, Government Printer, Wellington, New Zealand, 1959. A comprehensive report on New Zealand's fisheries containing sections on spiny lobsters, fishing vessels and personnel, fish landings by ports and species, methods of capture, foreign trade, fish-liver oil, whaling, rock oysters, dredged oysters, whitebait fishery, and freshwater fisheries. Also discusses fresh-water and marine research, Fishing Industry Advisory Council, and Legislation. A list of scientific names of fish and shellfish is included with a number of statistical tables giving detailed data on the fisheries.

NORTH ATLANTIC AREA:

Seefischerei und Fischereipolitik im Nordatlantischen Raum (Marine Fisheries and Governmental Fishery Policy in the North Atlantic Area), by Wilhelm Blanke, 232 pp., illus., printed in German, DM 45 (about US\$10.72). Verlag Krogers Buchdruckerei, Hamburg-Blankenese, Germany, 1959. After a brief reference to the extent of the commercial fisheries throughout the world, this book discusses the participation of various nations in prosecuting the fisheries in all areas of the North Atlantic. It describes quantities of fishery products harvested, trade in fishery products, and the nature of facilities used such as number of vessels, kinds and amounts of gear, harbor facilities, etc. The book also attempts to give some idea of governments' policy with respect to fisheries. It mentions aid given to the fishery industry in the form of research, subsidies, etc., and also mentions international treaty aspects of governments' relations in the North Atlantic Area. This picture and the extent of individual commercial fisheries in the North Atlantic is given for 22 nations, each in a separate section in Part II of the book. Many of these individual sections were written by contributors from the country concerned, which should help in providing a sound and accurate description on the subject for each country.

--W. H. Stoltzing

NUTRITION:

"Nutritive Value of Canned Meat," by P. L. Sawant and N. G. Magar, article, Journal of Scientific and Industrial Research (India), vol. 17C, 1958, pp. 189-191, printed. Journal of Scientific and Industrial Research, Old Mill Rd., New Delhi 2, India. Describes how canned fish was

packed in hot peanut oil and stored at 27° and 43° C. for 4 to 12 months. Results showed that soluble protein, amino acids, thiamine, riboflavin, and niacin all decreased; the changes were greater with longer time and higher temperature. The peroxide number of the muscle fat and of the covering oil increased after 4 months' storage.

Nutritive Value of Fish from Michigan Waters, by Ruth L. Ingalls and others, Technical Bulletin 219, 24 pp., printed. Michigan State College, Agricultural Experiment Station, East Lansing, Mich., May 1950.

Studies on the Nutritive Value of Lipids X--Sesamora Forming Activity of Esters of Fatty Acids with Higher Alcohols upon the Rats, by Takashi Kaneda and Kisei Sakurai, 9 pp., illus., printed in Japanese with English abstracts. (Reprinted from Bulletin of the Japanese Society of Scientific Fisheries, vol. 19, no. 12, April 1954, pp. 1168-1175.) Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

OCEANOGRAPHY:

The Floors of the Oceans I--The North Atlantic, by Bruce C. Heezen, Marie Tharp, and Maurice Ewing, Special Paper 65, 134 pp., of text and 11 charts, illus., printed. The Geological Society of America, 419 W. 117th St., New York 27, N. Y., April 11, 1959.

PARASITES:

Studies on Helminth Parasites from the Coast of Florida. III--Digenetic Trematodes of Marine Fishes from Tampa and Boca Ciega Bays, by Franklin Sogandares-Bernal and Robert F. Hutton, Contribution No. 19, 10 pp., illus., printed. (Reprinted from The Journal of Parasitology, vol. 45, no. 3, June 1959, pp. 337-346.) Florida State Board of Conservation Marine Laboratory, Maritime Base, Bayboro Harbor, St. Petersburg, Fla.

POISONOUS FISH:

Report of a Survey of the Fish Poisoning Problem in the Marshall Islands, by A. F. Bartsch, R. H. Drachman, and E. F. McFarren, 128 pp., illus., processed. Division of Sanitary Engineering Services and Communicable Disease Center, Bureau of State Services, Public Health Service, U. S. Department of Health, Education, and Welfare, Washington 25, D. C., January 1959.

PRESERVATION:

"Technical Aspects of the Commercial Use of Anti-Microbial Chemicals as Food Preservatives," by M. Ingram, article, Chemistry and Industry, no. 18, May 2, 1959, pp. 552-557, printed. Chemistry and Industry, 14 Belgrave Square, London S. W. 1, England.

Torry Research, 1958, on the Handling and Preservation of Fish and Fish Products (Report of the Director of the Torrey Research Station), 39 pp., printed, 2s. 6d. (about 35 U. S. cents). Her Majesty's Stationery Office, 13a Castle St.,

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Edinburgh 2, Scotland, 1959. Describes accomplishments in research during 1958 on improvement in quality of iced fish, freezing and cold-storage, smoke curing, drying, canning, fishery byproducts, bacteriology, and biochemistry. Includes work on objective assessment of freshness, preservative ices, air-blast freezing, electrostatic smoking, "browning" of dehydrated fish, reduction of free liquor in herring packs, fish meal pilot plant, marine bacteriophages, fish muscle enzymes, and many others.

PROTEINS:

"Biological Value of the Protein in Some Seafoods Used in Spain," by A. Pujol and G. Varela, article, *Anales de Bromatologia*, vol. 10, 1958, pp. 437-478, printed in Spanish, Sociedad Espanola de Bromatologia, Ciudad Universitaria, Edificio Facultad de Farmacia, Madrid, Spain.

"Proteins in Fish Muscle. 15--Note on the Preparation of Actin From Cod Muscle with Potassium Iodide," by J. R. Dingle, article, *Journal of the Fisheries Research Board of Canada*, vol. 16, March 1959, pp. 243-245, printed, *Journal of the Fisheries Research Board of Canada*, Queen's Printer and Controller of Stationery, Ottawa, Canada.

RADIOACTIVITY:

"Studies of the Radioactive Materials in the Radiologically Contaminated Fishes. IV--Group Separation Analysis of the Radioelements in a Contaminated Bigeye Tuna, *Parathunnus mebachi*," by Kazuo Shirai and Masamichi Saiki, article, *Bulletin of the Japanese Society of Scientific Fisheries*, vol. 23, no. 11, 1958, pp. 723-728, illus., printed in Japanese with English abstract, Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

RESEARCH VESSEL:

"The Design of a Research Stern Fishing Trawler--Part II," by J. C. Esteves Cardoso and C. R. Caldera Saraiva, article, *World Fishing*, vol. 8, no. 10, October 1959, pp. 59-60, 63-64, illus., printed, World Fishing, John Trundell, Ltd., St. Richards House, Eversholt St., London N. W. 1, England. Part II of a paper read at the meetings of the Institution of Naval Architects held in Lisbon in June 1959. Presents a detailed, critical description of the design and expected performance of a research vessel being built for the Portuguese Association of Trawler Owners. Discusses the main characteristics of the vessel--over-all length 186 feet, 3 inches; beam 35 feet; depth 15 feet/21 feet; displacement 1,300 metric tons; and hold capacity 4,340 cubic feet of frozen fish or 5,944 cubic feet of wet fish. The general arrangement includes a deckhouse with lateral passages to facilitate conveying the catch to the hold. The design features a large broad hanging stern with small immersion and a large breadth fore and aft at the waterline to ensure stability. Economy of weight is achieved by the extensive use of welding and the installation of a versatile high-speed power plant. The electrical installations are run by alternating current, except the winch

motor, which is run by direct current. A high-speed twin-engine Diesel plant provides propulsion, giving full power for trawling and towing. Drawings of the vessel's layout and propulsion system are shown.

SALMON:

Food of Salmonid Fishes of the Eastern North Pacific Ocean, by George H. Allen and William Aron, Reference 57-21, 27 pp., illus., processed, Department of Oceanography, University of Washington, Seattle 5, Wash., August 1957.

SALMON:

"The Salmon's Growing Problem in B. C.," article, *Trade News*, vol. 10, no. 4, October 1957, pp. 8-9, illus., printed, Director of Information and Educational Service, Department of Fisheries, Ottawa, Canada. Discusses the construction of fishways, pipelines, and control dams to solve the problems posed to the British Columbia salmon fisheries by the discharge of industrial wastes into waterways and the construction of hydroelectric dams.

SALMON EGGS:

"Egg Lipids of a Salmon, *Oncorhynchus keta* I--Fatty Oils from Salmon Eggs," by Koichi Zama and others, article, *Bulletin of the Japanese Society of Scientific Fisheries*, vol. 24, nos. 6 and 7, 1958, pp. 569-572, illus., printed in Japanese with English abstract, Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

SARDINES:

"Experiments in Cooking Sardines--II," by R. Meesemaeker and Y. Sohler, article, *Food Manufacture*, vol. 34, May 1, 1959, pp. 193-196, 204, printed, Food Manufacture, Leonard Hill, Ltd., Eden St., London N. W. 1, England.

SCALLOPS:

A New Fishery for Scallops in Western Florida, by Harvey R. Bullis, Jr., and Robert M. Ingle, 4 pp., printed, (Reprinted from *Proceedings of the Gulf and Caribbean Fisheries Institute*, Eleventh Annual Session, November 1958, pp. 75-78.) Florida State Board of Conservation, Marine Laboratory, St. Petersburg, Fla.

Offshore and Newfoundland Scallop Explorations, by L. M. Dickie and L. P. Chiasson, General Series Circular No. 25, March 1955, 4 pp., illus., printed, Fisheries Research Board of Canada, Atlantic Biological Station, St. Andrews, New Brunswick, Canada. To assess the prospects of an offshore scallop fishery, the Fisheries Research Board of Canada in cooperation with the Department of Fisheries, began explorations on the banks off Nova Scotia and Newfoundland in 1953. Three vessels were chartered for this work and commercial fishermen were encouraged to fish these areas. Explorations continued for about one year, but results did not indicate any extensive scallop beds on the Newfoundland and Nova Scotia Banks.

SEAWEED:

"Chemical Studies on Volatile Constituents of Seaweed. On Volatile Constituents of *Digenia*

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

simplex," by Teruhisa Katayama, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 24, no. 3, 1958, pp. 205-208, printed. Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

"Studies on the Bleaching and Utilization of the Seaweed 'Gulaman-Dagat' (Gracilaria confervoides), by J. I. Sulit, L. G. Salcedo, and P. C. Panganiban, paper, Proceedings Indo-Pacific Fisheries Council, 6th Session, September 30-October 14, 1955, section II, pp. 280-283, processed, Food and Agriculture Organization of the United Nations, Rome, Italy, 1956.

"Studies on the Vitamins of Seaweeds. I--Folic Acid and Folinic Acid," by Akio Kanazawa and Daiichi Kakimoto, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 24, nos. 6 and 7, 1958, pp. 573-577, illus., printed in Japanese with English abstract, figure, and tables. Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

SEINING:

"Danish Seining at Cheticamp," by G. J. Gillespie, article, Trade News, vol. 12, no. 3, September 1959, pp. 3-5, illus., printed. Director of Information and Educational Service, Department of Fisheries, Ottawa, Canada. The story of the fishermen of a small community on the west coast of Cape Breton Island who have worked together with a fishery cooperative to increase production fourfold within the past decade. With the development of Danish seining, the door has been opened to an ever-expanding diversified fishery. If this method of fishing can be utilized for catching cod and haddock, in addition to the usual flatfish, a secure future lies ahead for the Nova Scotia fishing industry.

SHARKS:

Shark Attack, by V. M. Coppleson, 281 pp., illus., printed. Angus and Robertson, Ltd., 89 Castlereagh St., Sydney, Australia, 1958.

SHRIMP:

Notes on TRACHYPENEUS (TRACHYSALAMBRIA) SIMILIS (Smith), in the Tortugas Shrimp Fishery, by Bonnie Eldred, Contribution No. 26, 2 pp., printed. (Reprinted from the Quarterly Journal of the Florida Academy of Science, vol. 22, no. 1, 1959.) Florida State Board of Conservation, Marine Laboratory, St. Petersburg, Fla.

Preliminary Analysis of Tortugas Shrimp Sampling Data, 1957-58, by Robert M. Ingle and others, Technical Series No. 32, 43 pp., illus., printed. Florida State Board of Conservation, Marine Laboratory, St. Petersburg, Fla., September 1959. A report on surveys conducted in compliance with a Florida Statute passed in 1957, aimed at conservation of the pink spotted shrimp of Dry Tortugas. Twelve sampling stations were established in the controlled area off the Florida keys. When the results of sampling show that shrimp in the area are smaller than 50 to the pound (heads off), the area is

closed to commercial fishing. The greater part of this report consists of statistical tables showing detailed findings of this continuing survey.

SOUTH PACIFIC ISLANDS:

"Some Notes on Fisheries in American Samoa, Fiji, and New Caledonia," by H. Van Pel, article, SPC Quarterly Bulletin, vol. 9, no. 3, July 1959, pp. 26-27, illus., printed, single copy 30 U. S. cents. South Pacific Commission, Box 5354, G. P. O., Sydney, Australia.

SPOILAGE:

"Spoilage of Fish in the Vessels at Sea: 6--Variations in the Landed Quality of Trawler-Caught Atlantic Cod and Haddock During a Period of 13 Months," by C. H. Castell, Jacqueline Dale, and Maxine F. Greenough, article, Journal of the Fisheries Research Board of Canada, vol. 16, March 1959, pp. 223-233, printed. Journal of the Fisheries Research Board of Canada, Queen's Printer and Controller of Stationery, Ottawa, Canada.

TENNESSEE VALLEY AUTHORITY:

History of Fish and Fishing in Norris--A TVA Tributary Reservoir, by Charles J. Chance, Contribution No. 116, 12 pp., illus., printed. (Reprinted from Proceedings of the Twelfth Annual Conference, Southeastern Association of Game and Fish Commissioners, pp. 116-127.) Southeastern Association of Game and Fish Commissioners, Columbia, S. C., 1958. Norris Reservoir, the first TVA tributary reservoir, completed in 1936, has a spillway surface area of 34,200 acres. Earliest fish inventory records indicated the presence of 65 indigenous species. Although several species were unable to cope with the reservoir environment, game and commercial species generally have prospered in the reservoir. Fish tagging studies conducted annually on Norris for 14 years indicate the relative rate of harvest and the degree of dispersion of each species within the reservoir.

THAILAND:

Fisheries Statistics of Thailand, 1958, 53 pp., illus., processed in Thai and English. Statistics Section, Department of Fisheries, Ministry of Agriculture, Bangkok, Thailand, September 1959. Contains statistical tables showing landings of marine and fresh-water fish and shellfish with comparative data from previous years; price data for fresh and salted fish; fish pond production; foreign trade in fishery products; registered Thai fishing vessels; fishing gear; revenue from fishing industry; maps of fishing grounds; and other pertinent data.

TRADE LIST:

The Bureau of Foreign Commerce, U. S. Department of Commerce, Washington 25, D. C., has published the following mimeographed trade list. Copies may be obtained by firms in the United States from that office or from Department of Commerce field offices at \$2 each.

Oils (Animal, Fish, and Vegetable)--Importers, Dealers, Producers, Refiners, and Exporters.

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Federal Republic of Germany and West Berlin, 20 pp. (September 1959). List the names and addresses, size of firms, and types of products handled by each firm. Includes firms dealing in fish oils, fish liver oils, sperm oils, and whale oils.

Oils (Animal, Fish, and Vegetable)--Importers, Dealers, Producers, Refiners, and Exporters, Japan, 24 pp. (August 1959). Lists the names and addresses, size of firms, and types of products handled by each firm. Includes firms dealing in fish liver oils, fish oils, and whale oil.

TRAWLING:

"Surface and Mid-Water Trawling," by A. F. Aalberg, article, *Kalomeihin Viesti*, nos. 1 and 2, February 6 and March 16, 1958, printed in Finnish. *Kalomeihin Viesti*, Kotka, Finland.

TUNA:

Biochemical Study on Tuna, 7 pp., illus., printed. Fisheries Agency, Ministry of Agriculture and Forestry, Tokyo, Japan, September 1959. A paper presented at the Tuna Conference between the United States and Japanese Governments.

Inter-American Tropical Tuna Commission, Annual Report for the Year 1958, 121 pp., illus., printed in Spanish and English. Inter-American Tropical Tuna Commission, Scripps Institution of Oceanography, La Jolla, Calif. Contains the annual report of the Commission, which discusses the program and progress of investigations and publication of research results and a report of the Director on investigations during the year 1958. The Director's report presents the compilation of current statistics of total catch, amount and success of fishing, and abundance of the fish populations; present status of the tuna populations; potential fishing power of the tuna fleets; and other studies of tuna catch statistics. It also covers research on tuna population structure, migrations, and vital statistics; other aspects of tuna biology and behavior; investigations of physical, chemical, and biological oceanography and tuna ecology; and investigations of biology, ecology, and life history of bait fishes.

Study on Green Flesh, 23 pp., illus., printed.

Fisheries Agency, Ministry of Agriculture and Forestry, Tokyo, Japan, September 1959. A paper presented at the Tuna Conference between the United States and Japanese Governments.

"Study on the Green Meat of Tuna," by Shuichi Hirao and others, article, *Bulletin of the Japanese Society of Scientific Fisheries*, vol. 24, no. 8, 1958, pp. 671-675, illus., printed in Japanese with English abstract. Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

UGANDA:

Annual Report of the Game and Fisheries Department (For the Period 1st July 1957 to 30th June, 1958), 101 pp., illus., printed. Government Printer, P. O. Box 33, Entebbe, Uganda, 1959. Part III describes the work of the Fish-

eries Division during the financial year 1958, including general statistics and information on supplies of fishing gear; fish production, consumption, and exports for 1957; boat building and mechanization of craft; fisheries research; and the crocodile industry. A section on the fisheries of Uganda by regions contains information on the industry at Lakes Albert, George, Edward, and Kyoga. Accomplishments in fish farming are also discussed. Other parts of the report concern game conservation.

UNITED KINGDOM:

The White Fish Industry, 46 pp., illus., printed. The White Fish Authority, Lincoln's Inn Chambers, 2/3 Cursitor St., London E. C. 4, England. An informative booklet for pupils and teachers dealing not only with white (or demersal) fish proper, but also with pelagic fish (other than herring) and with shellfish. Describes the history and scope of the British fishing industry, the species and quantities caught, fishing methods, fishing vessels and grounds, fishery research, distribution, processing, storage, marketing, and nutritive value.

U. S. S. R.:

Fishes--Dnieper River, by Aleksandr Ivanovich Ambroz, 408 pp., illus., printed in Russian. (An individual may borrow the copy on deposit at the Central Library, Department of the Interior, Washington 25, D. C. through his local library.)

Fishes--Russia, by P. G. Borisov and N. S. Ovsiannikov, 283 pp., illus., printed in Russian. (An individual may borrow the copy on deposit at the Central Library, Department of the Interior, Washington 25, D. C., through his local library.)

VENEZUELA:

The Marine Communities of Margarita Island, Venezuela, by Gilberto Rodríguez, Contribution No. 236, 44 pp., illus., printed. (Reprinted from *Bulletin of Marine Science of the Gulf and Caribbean*, vol. 9, no. 3, September 1959, pp. 237-280.) The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami, Fla. An analysis of the composition and arrangement of the littoral and sublittoral communities in a representative area of the Caribbean. Includes a summary of the most common forms of marine plants and invertebrates of Margarita Island.

VESSELS:

British Trawlers, by H. M. Le Fleming, 64 pp., illus., printed, 2s. 6d. (about 35 U. S. cents). Ian Allan, Ltd., Craven House, Hampton Court, Surrey, England. A directory of trawler owners and vessels in the United Kingdom. A short introduction describes the three classes of trawlers, methods of fishing, and types of engines used in trawlers.

VIETNAM:

Selected Articles on Fishing Industry in North Vietnam, JPRS: 655-D, 8 pp., processed. U. S. Joint Publications Research Service, Suite 300, 205 E. 42nd St., New York 17, N. Y., April 14,

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1959. Photocopies may be purchased from the Photoduplication Service, Library of Congress, Washington 25, D. C.) Includes translations of the following articles from *Non Lam*, no. 1, January 1959: "How to Increase the Catch of Salt-Water Fish," by Hoang Xuan Hai; and "Fresh-Water Fish Breeding During Winter-Spring Season," by Nguyen Sung.

VIRGINIA:

Treasures from the Sea, The Virginia Seafood Industry, by Robert S. Bailey, Educational Series No. 10, 24 pp., illus., processed. Virginia Fisheries Laboratory, Gloucester Point, Va., 1959. Easy and informative reading for the layman, this booklet tells the story of Virginia's fisheries from colonial times until the present day. Information is given on changes in value and composition of the catch, details of finfish, shellfish, and sport fisheries; and the role of the public in conservation and proper utilization of fishery resources. Tables and drawings depict average annual values and catches of five species between 1931-55, 1956 landings by gear, and other statistical data concerning Virginia's fishing industry.

WHALES:

"Treating and Processing of Whale Meat to Meat Products," by Otto Roemmele, article, *Die Fleischwirtschaft*, vol. 10, 1958, pp. 833-835, printed in German. *Die Fleischwirtschaft*, Verlagshaus Sponholz GmbH, Kockstrasse 60-61, Berlin SW68, Germany

WHALING:

"Whaling Operations in the Antarctic, Season 1958/59," article, *Norsk Hvalfangst-Tidende*, vol. 48, no. 9, September 1959, pp. 452-464, 467-468, 471-476, illus., printed in Norwegian and English. *Norsk Hvalfangst-Tidende*, Sandefjord, Norway. A survey of the whaling operations in the Antarctic in the season 1958/59 prepared for and submitted at the meeting of the International Whaling Commission in London in June 1959. Covers the most important regulations governing pelagic whaling in the season 1958/59 and gives the number of factory-ships and catching boats which have been engaged in pelagic whaling since 1945/46 and average gross tonnage. The catch and oil production of the individual expeditions, the output of byproducts, and related statistics concerning the whaling operations in the Antarctic during the season 1958/59 are presented.



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CANNED SALMON FEATURED IN COLOR FILMS AND RECIPE BOOKLET

Canned salmon can be the basis of good meals and intriguing and entertaining motion pictures. A three-unit story of salmon--two 14-minute sound-color films and a recipe booklet in color--were released January 15, 1960.



Salmon Cabbage Vinaigrette

plant sequences showing the canning of the product.

In the second film, six typical American cities are visited. Each visit is introduced by some exceptionally good pictures of the better-known landmarks. The cities are San Francisco, Seattle, Miami, Chicago, New Orleans, and New York. A favorite recipe, based upon historical or other characteristics of each city is developed in the film. For example, in San Francisco a can of salmon is utilized in an old Chinese recipe. In Seattle a can of salmon is converted into an attractive outdoor meal. All of the recipes shown in the Take a Can of Salmon film, and many others, are included in the recipe booklet which, incidentally, bears the same name as the film.

The motion pictures are so arranged that they can be used for two 14-minute showings or used in sequence for a 28-minute show. These films, as are most other Bureau films, are cleared for use on television.

The films and the recipe booklet are sponsored by the Canned Salmon Institute, Inc., and produced by the U. S. Bureau of Commercial Fisheries, under contract with Sun Dial Films, Inc., and M. P. O., both commercial motion picture producers in New York City. The films will be distributed on a free-loan basis through Bureau sources and the Bureau's 170 cooperating film libraries throughout the country. Applications for loan should be sent to the Visual Education Unit, U. S. Bureau of Commercial Fisheries, Post Office Box 128, College Park, Md. A catalog of other available fishery educational films is obtainable from College Park or from the U. S. Fish and Wildlife Service, Washington 25, D. C. You can buy the recipe booklet--Take a Can of Salmon--for 15 cents a copy from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. There is a 25-percent discount on orders of 100 or more copies sent to one address.

The titles of the films, Salmon - Catch to Can, and Take a Can of Salmon, are descriptive of the subject matter. The first begins with the life cycle of the salmon and the three common ways of catching them and ends with getting the salmon into the can. The second "takes a can of salmon" and shows the attractive meals as housewives in six typical American cities prepare them.

Alaska is the site of filming of most of the first picture. Gill-netting, trolling, and purse-seining for salmon are shown in some detail. There are also scenes on salmon biology which should be especially interesting to science classes in grade or high schools. These are followed by several in-

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Fishes

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COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries
prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
H. M. Bearse, Assistant Editor

Mailed free to members of the fishery and allied industries. Address correspondence and requests to the: Chief, Branch of Market News, Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington 25, D. C.

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THE POUND-NET FISHERY IN VIRGINIA

Part 2 - Species Composition of Landings Reported as Menhaden^{1/}

By J. L. McHugh*

BACKGROUND

Pound nets have been the most important fishing gear for food fishes in Virginia waters of Chesapeake Bay since 1880 (Reid 1955) and the history of this fishery to a great extent reflects the varying fortunes of the fisheries of that State. Since 1929 the average annual catch in pound nets in Virginia has been about 50 million pounds, roughly 20 percent of which was reported as menhaden. Actually these menhaden include varying quantities of other fish species, sometimes predominantly young food fishes, too small to market as human food. This part of the pound-net catch is sometimes used as industrial fish, but in many parts of the Bay it is sold as bait for crab pots. It is commonly referred to as "scrap fish," and for convenience this term has been used here to denote that part of the pound-net catch not sold for human consumption. Concern has been expressed at various times that this harvest of small fishes is wasteful, yet no really effective action has been taken to determine the facts needed for an intelligent appreciation of the situation.

Reid (1955) has reviewed the tribulations that accompanied introduction of pound nets to Virginia waters. Early reports of the Virginia Commission of Fisheries emphasize the "destruction" caused by these nets, and in 1914 a "cull law" was enacted designating minimum sizes of fishes that may be caught (Code of Virginia, Section 28-45). It soon became apparent that the value of this law was limited, for most undersized fish were dead before culling could be done, and it was suggested on various occasions that an increase in mesh size, or closed seasons at certain times, would offer more practical solutions.

Almost as soon as these remedial measures have been proposed they have been challenged by others. Some of the objections seem reasonable, but there is an obvious thread of self-interest running through all the controversy that has been generated, and none of the arguments is supported by indisputable facts. Culling is far from a practical solution: it would be impossible in bad weather; even under the best of conditions it would be time-consuming, and many fishermen would not be inclined to make the effort for a gain that was not immediately apparent; and most fish probably would not survive the rough handling that would ensue. An increase in mesh size, although it has been a popular remedy on many occasions, is opposed by many fishermen on the grounds that fish would gill in the nets. Closed seasons, when they have been proposed seriously, have been suggested for midsummer, when pound-net catches are at a minimum and relatively unprofitable, and the benefits to be gained would be at a minimum, too.

The conviction that an increase in mesh size would allow many small fish to escape, though opposed by many fishermen who believed that gilling would interfere

^{1/}Contributions from the Virginia Fisheries Laboratory, No. 89.

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seriously with their operations, was sufficiently strong that in 1928 the General Assembly of Virginia directed the Commission of Fisheries to conduct experiments with various mesh sizes. This was done (Houston 1929) by arrangement with certain fishermen who placed panels of $2\frac{1}{2}$ - and 3-inch stretched mesh in their nets, and the following conclusion was drawn: "It is claimed that mesh larger than an inch bar (2 inches stretched) will gill fish to an extent to make it impracticable. The experiments, as reported, bore out this contention." In the absence of better documentary evidence, it can scarcely be maintained that the matter was settled adequately.

Declines in Virginia fisheries since World War II, economic as well as biological in origin (McHugh and Bailey 1957), brought the question to the fore once again, and in 1952 the General Assembly instructed the Commission of Fisheries and the Virginia Fisheries Laboratory "to determine the proper size mesh for nets in fixed fishing devices." The proponents of this bill failed to recognize the full implication of their directive, which, if it is to be complied with in full measure, will require knowledge of the effects of mesh-size changes upon the future supply of fish. This, in effect, is already one of the objectives of the work of the Virginia Fisheries Laboratory, progress toward which, although steady, has been slow by reason of limited funds and personnel and the need for more comprehensive programs of research in neighboring states, where these species are also exploited.

Samples of scrap fish after they have been culled by fishermen from pound-net catches in the lower York River and off York Spit were examined in 1954 and 1955, primarily to study size- and age-composition of the menhaden catch (McHugh, Oglesby, and Pacheco 1959). When convenient, other species in this scrap were measured and weighed. In 1958 a special effort was made to examine samples of scrap at weekly intervals throughout the fishing season, and all species in a half-bushel sample were measured and weighed individually. If more than 100 fish of a species were present, the excess usually were counted but not measured or weighed, and the total weight of that species was estimated from the weight of the first 100. Lengths were measured from tip of snout to fork of caudal fin, or in fishes like hogchoker, croaker, or gray sea trout, to the end of the longest caudal rays. In 1958 also, the total weights of individual food fish species and total weights of scrap landed were obtained whenever possible, for comparison of the numbers and weights used as human food or as industrial fish and bait.

1954 SAMPLES

The 1954 study was made by a graduate student as a term project. He identified 21 species in 21 samples, but lumped alewife and glut herring, and butterfish and harvestfish. It is fairly obvious that he failed to recognize thread herring as a distinct species, for although it figured prominently in 1955 and 1958 catches, it was not listed in 1954. Thread herring undoubtedly were confused with river herrings, for this category was recorded for every sample examined in 1954, although later experience, and

Table 1 - Species Composition of Scrap Fish Samples from Pound-Net Catches, Lower York River, Virginia, 1954, Obtained by Adding Numbers of Fishes in all Samples Examined

Common Name	Scientific Name	Total Numbers of Fish	Percentage of Samples in Which Species Occurred
Menhaden	<i>Brevortia tyrannus</i>	2, 100	100
Alewife	<i>Alosa pseudoharengus</i>	637	100
Glut herring	<i>Alosa aestivalis</i>		
Thread herring	<i>Opisthonema oglinum</i>		
Butterfish	<i>Poronotus triacanthus</i>	562	91
Harvestfish	<i>Peprilus alepidotus</i>		
Mitchill's anchovy	<i>Anchoa mitchilli</i>		
Gray sea trout	<i>Cynoscion regalis</i>	144	43
Spot	<i>Leiostomus xanthurus</i>	90	86
Silver perch	<i>Bairdiella chrysura</i>	77	76
Cutlassfish	<i>Trichiurus lepturus</i>	51	48
Blue runner	<i>Caranx crysos</i>	41	38
Croaker	<i>Micropogon undulatus</i>	27	19
Flounder	<i>Paralichthys dentatus</i>	24	33
Hogchoker	<i>Trinectes maculatus</i>	12	29
Bluefish	<i>Pomatomus saltatrix</i>	6	29
Sea robin	<i>Prionotus</i>	6	14
Puffer	<i>Sihaeroides maculatus</i>	4	14
Hickory shad	<i>Alosa mediocris</i>	2	10
Shad	<i>Alosa sapidissima</i>	1	5
Black sea bass	<i>Centropomus striatus</i>	1	5
Toadfish	<i>Opsanus tau</i>	1	5

previous knowledge of the migrations of river herrings, have shown that these species usually disappear from catches in July, whereas thread herring do not appear until June and remain until fall.

Table 2 - Species Composition of Scrap Fish Samples from Pound-Net Catches, Lower York River, Virginia, 1955, Obtained by Adding Numbers of Fishes in all Samples Examined

Common Name	Scientific Name	Total Numbers of Fish	Percentage of Samples in Which Species Occurred
Menhaden	<u>Brevoortia tyrannus</u>	1,672	100
Butterfish	<u>Foronotus triacanthus</u>	476	86
Gray sea trout	<u>Cynoscion regalis</u>	153	71
Thread herring	<u>Opisthonema oglinum</u>	118	29
Mitchill's anchovy	<u>Anchoa mitchilli</u>	93	57
Alewife	<u>Alosa pseudoharengus</u>	88	43
Glut herring	<u>Alosa aestivalis</u>		
Hickory shad	<u>Alosa mediocris</u>		
Scup	<u>Stenotomus versicolor</u>	42	21
Silver perch	<u>Bairdiella chrysura</u>	25	64
Spot	<u>Leiostomus xanthurus</u>	23	43
Harvestfish	<u>Pepilus alepidotus</u>	15	50
Cutlassfish	<u>Trichiurus lepturus</u>	8	29
Croaker	<u>Micropogon undulatus</u>	7	14
Moonfish	<u>Vomer setapinnis</u>	4	29
Black sea bass	<u>Centropristes striatus</u>	2	7
Hogchoker	<u>Trinectes maculatus</u>	1	7
Sea robin	<u>Prionotus sp.</u>	1	7
Puffer	<u>Sphaeroides maculatus</u>	1	7
Silverside	<u>Menidia menidia</u>	1	7

Table 1 therefore does not show all species necessarily in their proper order of importance, and contains 22 species instead of the 21 recognized in the original work.

1955 SAMPLES

A few samples in 1955 were examined by the author, but most by a summer assistant who had difficulty distinguishing between alewife, glut herring, and hickory shad. Therefore, these species are grouped in table 2, and may not be in proper sequence according to numbers or frequency of occurrence. In 14 samples of scrap, 20 species were recognized. It is interesting that moonfish (Vomer setapinnis), fairly common in 1955, did not appear in pound-net catches in 1954 or 1958.

Sampling in 1955 was in some respects not as representative as in 1954 and 1958, for no catches were examined from August 13 to November 26.

1958 SAMPLES

Sampling in 1958 was more thoroughly and carefully done, and identifications were checked for accuracy. In 25 samples, 33 species were recognized (table 3.)

Table 3 - Species Composition of Scrap Fish Samples from Pound-Net Catches, Lower York River, Virginia, 1958, Obtained by Adding Numbers and Weights of Fishes in all Samples Examined

Common Name	Scientific Name	Total Numbers of Fish	Percentage of Samples in Which Species Occurred	Total Weight (Lbs.)
Menhaden	<u>Brevoortia tyrannus</u>	5,821	100	294,662
Butterfish	<u>Foronotus triacanthus</u>	1,274	84	57,106
Thread herring	<u>Opisthonema oglinum</u>	403	56	23,005
Gray sea trout	<u>Cynoscion regalis</u>	260	72	20,663
Blue runner	<u>Caranx cryos</u>	226	36	12,588
Spot	<u>Leiostomus xanthurus</u>	219	80	13,555
Alewife	<u>Alosa pseudoharengus</u>	207	25	12,873
Glut herring	<u>Alosa aestivalis</u>	177	32	29,984
Bigeye scad	<u>Trachurus crumenophthalmus</u>	107	36	3,973
Silver perch	<u>Bairdiella chrysura</u>	88	72	6,274
Mitchill's anchovy	<u>Anchoa mitchilli</u>	80	20	142
Bluefish	<u>Pomatomus saltatrix</u>	34	32	2,852
Hogchoker	<u>Trinectes maculatus</u>	34	36	1,238
Croaker	<u>Micropogon undulatus</u>	25	12	2,468
Scup	<u>Stenotomus versicolor</u>	22	28	1,836
Harvestfish	<u>Pepilus alepidotus</u>	11	24	769
Hickory shad	<u>Alosa mediocris</u>	8	16	2,070
Shad	<u>Alosa sapidissima</u>	4	12	1,193
Blue crab	<u>Callinectes sapidus</u>	4	12	248
Black sea bass	<u>Centropristes striatus</u>	3	12	359
Spotted hake	<u>Urophycis regius</u>	3	8	112
Striped anchovy	<u>Anchoa hepsetus</u>	3	8	37
Silverside	<u>Menidia menidia</u>	3	8	22
Flounder	<u>Paralichthys dentatus</u>	3	12	221
Northern puffer	<u>Sphaeroides maculatus</u>	2	8	221
Pinfish	<u>Lagodon rhomboides</u>	1	4	51
Pigfish	<u>Orthopristis chrysopterus</u>	1	4	63
Atlantic mackerel	<u>Scomber scombrus</u>	1	4	81
Atlantic needlefish	<u>Strongylura marina</u>	1	4	5
Bluegill	<u>Lepomis macrochirus</u>	1	4	106
Common sea robin	<u>Prionotus carolinus</u>	1	4	12
Gizzard shad	<u>Dorosoma cepedianum</u>	1	4	346

For most samples, also, records were obtained of total weight of each species caught, so that the numbers and weights of each species used as food or discarded as scrap could be estimated (table 4). The 17 samples summarized in table 4, taken from

Table 4 - Estimated Total Numbers and Weights of Each Species in a Series of 17 Pound-Net Catches Made from April 7, to October 15, 1958, in the Lower York River or off York Spit, Virginia/

Species	Food Fish		Scrap Fish	
	Estimated Numbers	Total Weights (Lbs.)	Estimated Numbers	Total Weights (Lbs.)
Menhaden	-	-	207,616	23,157
Butterfish	23,250	4,650	40,838	4,333
Alewife	-	-	10,864	1,327
Thread herring	-	-	9,761	1,259
Glut herring	-	-	8,545	3,325
Spot	5,714	1,699	8,255	1,228
Gray sea trout	20,221	7,410	7,622	1,342
Blue runner	-	-	5,192	640
Bay anchovy	-	-	4,203	17
Bigeye scad	-	-	2,750	236
Silver perch	-	-	2,408	369
Croaker	22,121	20,331	1,280	295
Bluefish	25	25	1,261	234
Hogchoker	-	-	1,028	70
Scup	-	-	793	119
Harvestfish	1,400	400	565	95
Hickory shad	-	-	445	317
Shad	125	437	200	134
Spotted hake	-	-	167	14
Flounder	111	277	139	34
Silverside	-	-	132	2
Black sea bass	-	-	128	28
Striped anchovy	-	-	101	1
Gizzard shad	-	-	72	55
Bluegill	-	-	71	17
Pigfish	-	-	71	10
Needlefish	-	-	67	10
Pinfish	-	-	58	6
Blue crab	-	-	32	5
Sea robin	-	-	29	1
Puffer	-	-	29	1
Rockfish	33	66	-	-
Slender amberjack	25	25	-	-
False albacore	10	100	-	-
Mixed fishes	-	800	-	-
Total	273,035	36,220	314,752	38,681

1/Estimated numbers of food fishes were derived from total weight of catch multiplied by average numbers of commercial-size fish per pound. Estimated numbers of scrap fish and their total weights were derived from numbers and weights of scrap in each sample, and the total weight of scrap fish in each catch.

2/Number of mixed fishes not included.

catches in the lower York River or off York Spit from April 7 to October 15, 1958, show that roughly equal weights of food and scrap fish were landed, but that more than four times as many fish were discarded as scrap. Many scrap fish were of species that usually are not used as food, such as menhaden, thread herring, blue runner, anchovy, scad, and silver perch, but some important food fishes, such as butterfish and spot, were more numerous in scrap than in food-fish landings.

Seasonal variations in species composition and in numbers and weights of scrap fish in pound-net samples, weighted according to total catch of scrap, are given in tables 5 and 6 (which appear on page 5). In early spring, only menhaden, alewives, and glut herring were found, but a variety of species entered the catch as the season progressed. Some species appeared for a while and then disappeared, some occurred only spasmodically, others were caught regularly once they put in an appearance. Samples taken at regular intervals may not be truly representative of the relative abundance of the different species, because some fishes, like alewives and blue runner, remain in Chesapeake Bay for only a short time, while others, like menhaden, are available for most of the year.

These may have included some scup, spot, gray sea trout, croaker, bluefish, harvestfish, shad, flounder, puffer, rockfish, amberjack, drum, whiting, mackerel, mullet, spotted sea trout, Spanish mackerel, white perch, and others. These samples are not necessarily representative of the pound-net catch in the whole area of Tidewater Virginia, for our observations have shown that each locality has its own characteristic complex of species. Alewives, for example, are the most important

Table 5 - Estimated Catch, by Numbers, of Scrap Fish in Pound-Net Catches in the Lower York River, Virginia, 1958/1

Table 3 - Estimated Catch, by Numbers, of Scrap Fish in Pound-Net Catches in the Lower York River, Virginia, 1951/																				
Species	April			May			June			July			August			September			October	
	7	22	30	13	20	5	1	15	25	30	7	19	5	12	23	4	15			
Menhaden	6,720	4,004	8,800	35,024	12,324	30,250	19,333	6,050	3,800	5,175	3,379	14,666	21,743	23,641	13,977	1,400	3,265			
Glut herring	6,090	858	67	516	1,185	-	-	-	-	-	-	-	-	-	-	-	-			
Alewife	892	2,646	6,867	194	316	-	-	-	-	-	-	-	-	-	-	-	-			
Gizzard shad	-	72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Spot	-	1,430	2,267	838	2,133	1,080	-	-	40	97	46	347	-	-	65	34	117			
Butterfish	-	-	67	774	79	3,920	6,840	8,090	6,140	3,370	916	2,733	1,054	1,500	477	1,808	3,156			
Shad	-	-	-	64	158	-	-	-	-	-	-	-	-	-	-	-	-			
Silver perch	-	-	-	258	632	-	64	40	97	-	63	333	36	424	375	175	-			
Pinfish	-	-	-	64	-	-	-	-	-	-	-	-	-	-	-	-	-			
Hickory shad	-	-	-	-	395	-	-	-	-	-	-	-	36	-	34	-	10			
Croaker	-	-	-	-	1,422	-	-	-	-	-	-	-	-	-	-	-	-			
Bluefish	-	-	-	-	158	250	-	430	97	323	-	-	-	-	-	-	19			
Pigfish	-	-	-	-	79	-	-	-	-	-	-	-	-	-	-	-	-			
Hogchoker	-	-	-	-	78	167	-	-	-	-	-	-	-	33	68	612	77			
Gray sea trout	-	-	-	-	237	167	575	1,880	1,460	1,845	316	733	109	130	136	58	-			
Bluegill	-	-	-	-	78	-	-	-	-	-	-	-	-	-	-	-	-			
Harvestfish	-	-	-	-	333	-	-	80	-	-	-	133	-	-	-	-	19			
Thread herring	-	-	-	-	416	383	118	7,200	740	189	333	109	-	-	273	-	-			
Flounder	-	-	-	-	80	-	-	40	-	-	-	-	-	-	-	-	19			
Spotted hake	-	-	-	-	167	-	-	-	-	-	-	-	-	-	-	34	321			
Scup	-	-	-	-	333	-	-	40	-	46	-	-	-	-	-	-	19			
Bay anchovy	-	-	-	-	-	-	2,872	-	65	785	442	-	-	-	-	-	39			
Silverside	-	-	-	-	-	-	-	40	-	82	-	-	-	-	-	-	-			
Blue crab	-	-	-	-	-	-	-	-	32	-	-	-	-	-	-	-	-			
Black sea bass	-	-	-	-	-	-	-	-	-	-	32	87	-	-	-	29	-			
Atlantic needlefish	-	-	-	-	-	-	-	-	-	-	-	67	-	-	-	-	-			
Blue runner	-	-	-	-	-	-	-	-	-	-	-	800	727	228	1,739	963	736			
Bigeys scad	-	-	-	-	-	-	-	-	-	-	-	133	182	261	1,193	875	135			
Striped anchovy	-	-	-	-	-	-	-	-	-	-	-	36	65	-	-	-	-			
Common sea robin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29	-			
Northern puffer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29	-			
Number of nets	6	-	-	3	6	4	4	4	4	4	3	3	3	3	3	3	2			

(Note) Numbers of each species estimated from total weight of scraps in each day's catch according to the ratio of numbers to weight in each sample.

1/ Total numbers of each species estimated from total weight of scrap in each day's catch according to the ratio of numbers to weight in each sample.

Table 6 - Estimated Catch, in Pounds, of Scrap Fish in Pound-Net Catches in the Lower York River, Virginia, 1958/1

Table 6 - Estimated Catch in Pounds, of Scrap Fish in Pound-Net Catches in the Lower York River, Virginia, 1958/																		
Species	April			May		June	July				August			September			October	
	7	22	30	13	20	5	1	15	25	30	7	19	5	12	23	3	15	
Menhaden	1,477	1,073	1,113	3,450	2,596	3,263	2,311	734	517	873	354	2,250	1,296	1,170	990	97	176	
Glut herring	2,388	267	29	207	505	-	-	-	-	-	-	-	-	-	-	-	-	
Alewife	335	360	499	22	126	-	-	-	-	-	-	-	-	-	-	-	-	
Gizzard shad	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Spot	-	245	352	105	304	174	-	8	8	2	35	-	-	-	+	+	17	
Butterfish	-	-	7	91	9	316	524	826	752	435	123	360	130	165	60	229	315	
Shad	-	-	-	73	76	-	-	-	-	-	-	-	-	-	-	-	-	
Silver perch	-	-	-	45	98	-	9	8	19	-	8	30	5	75	60	27	-	
Pinfish	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	
Hickory shad	-	-	-	-	349	-	-	-	-	-	-	-	2	-	+	-	1	
Croaker	-	-	-	-	328	-	-	-	-	-	-	-	-	-	-	-	-	
Bluefish	-	-	-	24	57	-	-	71	20	63	-	-	-	-	-	-	2	
Pigfish	-	-	-	11	-	-	44	-	-	-	-	-	-	-	-	-	-	
Hogchoker	-	-	-	7	6	-	-	-	-	-	-	-	-	+	+	48	10	
Gray sea trout	-	-	-	48	26	99	310	285	320	46	150	20	15	15	13	-	-	
Bluegill	-	-	-	19	-	-	-	-	-	-	-	-	-	-	-	-	-	
Harvestfish	-	-	-	-	46	-	19	-	-	-	30	-	-	-	-	-	1	
Thread herring	-	-	-	-	52	-	17	893	98	29	60	21	-	-	45	-	-	
Flounder	-	-	-	-	31	-	2	-	-	-	-	-	-	-	-	-	1	
Spotted hake	-	-	-	-	14	-	-	-	-	-	-	-	-	-	-	-	-	
Scup	-	-	-	-	15	-	5	-	5	-	-	-	-	-	+	89	5	
Bay anchovy	-	-	-	-	-	-	13	-	1	2	1	-	-	-	-	-	1	
Silverside	-	-	-	-	-	-	-	+	2	-	-	-	-	-	-	-	-	
Blue crab	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	
Black sea bass	-	-	-	-	-	-	-	-	-	-	4	10	-	-	-	14	-	
Atlantic needlefish	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	
Blue runner	-	-	-	-	-	-	-	-	-	-	90	110	45	225	100	70	-	
Bigeys scad	-	-	-	-	-	-	-	-	-	-	10	15	30	105	64	11	-	
Striped anchovy	-	-	-	-	-	-	-	-	-	-	-	1	+	-	-	-	-	
Common sea robin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	
Northern puffer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	
Number of nets	6	-	-	3	6	4	4	4	4	4	3	3	3	3	3	3	2	
1/ Total catch of scrap fish for each day prorated according to weight of each species in sample.																		
+ = Less than one pound.																		

1/ Total catch of scrap fish for each day prorated according to weight of each species in sample.

+ = Less than one pound.

species by weight in Virginia's pound-net catch, but they were of less importance in our samples from the York River, partly because early spring catches were not adequately sampled. Butterfish ranked tenth in importance by weight in 1957, but they were one of the most important species in York River samples in 1958. On the other hand there is general similarity between pound-net catches as recorded by the U. S. Bureau of Commercial Fisheries (Power 1959) and the 17 samples from the York River in 1958.

SPECIES COMPOSITION OF POUND-NET LANDINGS

One of the first steps in a study of industrial and unmarketable food fishes is to determine what species are represented, and in what quantities. According to latest published figures pound nets in Virginia caught at least 42 species in 1957 (Power 1959). This is a minimum estimate, for certain categories in the official listing, such as alewives, catfish and bullheads, and some others, include more than one species, and scrap includes many species that are not used locally for human food, hence are not listed in official statistics. Investigations reported here showed that at least 35 species occur in pound-net scrap (table 1 to 3), at least 13 of which are not marketed in Virginia for human food. Table 7 (see p. 7) lists all species known to occur in pound-net catches in Virginia, based on 1957 landings (Power 1959), samples of scrap examined in 1954, 1955, and 1958, and observations made by various staff members of the Virginia Fisheries Laboratory while sampling catches.

Scrap-fish landings vary not only locally within the Bay and its estuaries, but also annually. It has been pointed out already that moonfish were found in our samples only in 1955. Cutlassfish, fairly common in 1954 and less common in 1955, were absent in 1958. Several other interesting changes are suggested by the figures in tables 1 to 3, but it would require more information to determine their significance. There is good reason to believe, for example, that young croaker figured much more prominently in scrap in the past when the species was more abundant, and the decline in frequency of their appearance in samples from 1954 to 1958 is suggestive that the recent increase in abundance is only temporary, a conclusion supported by other evidence (W. H. Massmann and A. L. Pacheco, personal communication).

It is convenient to treat scrap fish under two main headings: nonfood or industrial species, measurements and weights of which have considerable biological significance because the entire catch was represented in each sample; and food fishes, data from which are somewhat less useful because culling is variable, depending on the magnitude of the catch, prices, and other factors.

NON-FOOD FISHES

Menhaden (*Brevoortia tyrannus*):

Atlantic coast, 1957: 1,327,595,000 pounds, valued at \$16,771,000.



By far the most important scrap species was menhaden, which made up nearly two-thirds of scrap catches by numbers and by weight, and was the only species that occurred in every sample examined. By weight, menhaden are an important component of pound-net landings in Virginia. According to official statistics (Power 1959) more than 25 million pounds were landed in 1957, about 46 percent of the entire pound-net catch, and nearly 10 percent of the total menhaden catch of the State. Menhaden landings as reported for pound nets probably are a collective term for all scrap fish, hence only about 16 million pounds actually were menhaden, and the remaining 9 million pounds included a variety of species as listed in table 7 (p. 7). Most menhaden caught by pound nets in Virginia

Table 7—Species Caught by Pound Nets in Virginia, Based on 1957 Commercial Landings, Examination of Scrap-Fish Catches in 1954, 1955, and 1958, and Observations Made While Sampling Catches¹

Common Name	Scientific Name	Disposal of Catch		Common Name	Scientific Name	Disposal of Catch	
		Food	Use or Bait			Food	Industrial Use or Bait
Atwater	<i>Alosa pseudoharengus</i>	x	x	Flounder	<i>Orthopteria chrysotenus</i>	x	x
Anchovy, slender	<i>Seriola zonata</i>	x	x	Flounder	<i>Leptocottus armatus</i>	x	x
Anchovy, bay	<i>Anchoa mitchilli</i>	x	x	Pompano, common	<i>Trachurus carolinus</i>	x	x
Anchovy, striped	<i>Anchoa hepsetus</i>	x	x	Puffer, northern	<i>Sphaeroides maculatus</i>	x	x
Bass, black	<i>Myxina quachancho</i>	x	x	Puffer, southern	<i>Lagodon rhomboides</i>	x	x
Bass, striped	<i>Myxina quachancho</i>	x	x	Ray	<i>Myxobatis tenuicollis</i>	x	x
Beye, short	<i>Pseudopleuronectes americanus</i>	x	x	cownose	<i>Rhinoptera bonasus</i>	x	x
Beye, long	<i>Pseudopleuronectes americanus</i>	x	x	greater butterfly	<i>Gymnura altevela</i>	x	x
Blue crab	<i>Callinectes sapidus</i>	x	x	lesser butterfly	<i>Gymnura micrura</i>	x	x
Breem	<i>Leiostomus xanthurus</i>	x	x	spotted eagray	<i>Aetideus nasutus</i>	x	x
Bluish	<i>Leiostomus xanthurus</i>	x	x	Remora, shark	<i>Echeneis naucrates</i>	x	x
Bonafish	<i>Albia vulpes</i>	x	x	Runner, blue	<i>Caranx cryos</i>	x	x
Bonito	<i>Sarda sarda</i>	x	x	Scad, bigeye	<i>Trachurus trachurus</i>	x	x
Bullhead	<i>Ictalurus nebulosus</i>	x	x	Scup	<i>Stenotomus versicolor</i>	x	x
Bullhead, brown	<i>Ictalurus nebulosus</i>	x	x	Sea bass, black	<i>Centropristis striata</i>	x	x
Bullhead, yellow	<i>Ictalurus nebulosus</i>	x	x	Sea bass, white	<i>Centropristis striata</i>	x	x
Butterfish	<i>Poronotus triacanthus</i>	x	x	Sea robin, common	<i>Cynoscion regalis</i>	x	x
Butterflyfish	<i>Chaetodon ocellatus</i>	x	x	Sea trout, gray	<i>Cynoscion nebulosus</i>	x	x
Carp	<i>Cyprinus carpio</i>	x	x	Sea trout, silver	<i>Cynoscion nebulosus</i>	x	x
Carfish, channel	<i>Ictalurus punctatus</i>	x	x	Shad, gizzard	<i>Alosa sapidissima</i>	x	x
Croaker, Atlantic	<i>Macrurus carinatus</i>	x	x	Shad, hickory	<i>Alosa mediocris</i>	x	x
Croaker, white	<i>Macrurus carinatus</i>	x	x	Sharks:			
Croaker, banded	<i>Macrurus carinatus</i>	x	x	brown	<i>Etmopterus bilineatus</i>	x	x
Cutlassfish	<i>Trachurus leporus</i>	x	x	angelshark	<i>Sphyrna tiburo</i>	x	x
Drum, black	<i>Scophthalmus aquosus</i>	x	x	dogfish	<i>Sphyrna tiburo</i>	x	x
Drum, white	<i>Scophthalmus aquosus</i>	x	x	hammer-head	<i>Sphyrna tiburo</i>	x	x
Eel, American	<i>Anguilla rostrata</i>	x	x	smooth dogfish	<i>Sphyrna tiburo</i>	x	x
Eel, conger	<i>Conger oceanica</i>	x	x	Sheepshead	<i>Archosargus probatocephalus</i>	x	x
Filletfish, common	<i>Monacanthus hispidus</i>	x	x	Sliverside, Atlantic	<i>Wentidia meridia</i>	x	x
Filletfish, orange	<i>Monacanthus hispidus</i>	x	x	Sparguer, northern	<i>Chlorophthalmus labrus</i>	x	x
Filletfish, white	<i>Monacanthus hispidus</i>	x	x	Sockeye, chub	<i>Chlorophthalmus labrus</i>	x	x
Flounder, summer	<i>Paralichthys oblongus</i>	x	x	Suckers, Eastern	<i>Notropis oblongus</i>	x	x
Flounder, winter	<i>Paralichthys oblongus</i>	x	x	redhorse	<i>Notropis oblongus</i>	x	x
Gar, longnose	<i>Lepisosteus osseus</i>	x	x	Tarpon	<i>Moxostoma macrolepidotum</i>	x	x
Goosfish	<i>Lepisosteus osseus</i>	x	x	Tautog	<i>Tautog onitis</i>	x	x
Goosfish, striped	<i>Lepisosteus osseus</i>	x	x	diamondback	<i>Malaclemys terrapin</i>	x	x
Harvestfish	<i>Opilius americanus</i>	x	x	Threadfish	<i>Aletris crinitus</i>	x	x
Herring, bigeye	<i>Elops saurus</i>	x	x	Toadfish	<i>Opsanus tau</i>	x	x
Herring, glut	<i>Elops saurus</i>	x	x	Tonguefish	<i>Symphurus plagusia</i>	x	x
Herring, sea	<i>Elops saurus</i>	x	x	Tonguefish, common	<i>Symphurus plagusia</i>	x	x
Hogchoker	<i>Trachinotus carolinus</i>	x	x	Tripetail	<i>Chirocentrus niger</i>	x	x
Jack, common	<i>Caranx hippos</i>	x	x	Tuna, little	<i>Euthynnus alletteratus</i>	x	x
Lamprey, sea	<i>Petromyzon marinus</i>	x	x	Turtles:			
Lizardfish, Atlantic	<i>Synodus foetens</i>	x	x	green	<i>Chelonia mydas</i>	x	x
Lumpfish	<i>Scopelogadus aurolineatus</i>	x	x	loggerhead	<i>Caretta caretta</i>	x	x
Lumpfish	<i>Scopelogadus aurolineatus</i>	x	x	sea turtle	<i>Caretta caretta</i>	x	x
Macarel, Atlantic	<i>Scomber scombrus</i>	x	x	Atlantic ridley	<i>Lepidochelys kempi</i>	x	x
Macarel, Spanish	<i>Scomber scombrus</i>	x	x	Whiting, northern	<i>Merluccius saxatilis</i>	x	x
Menhaden	<i>Brevoortia tyrannus</i>	x	x	Whiting, southern	<i>Merluccius americanus</i>	x	x
Monkfish	<i>Urophycis regia</i>	x	x				
Needlefish, Atlantic	<i>Abraxocheilichthys</i>	x	x				
Needlefish, flatside	<i>Abraxocheilichthys</i>	x	x				
Perch, silver	<i>Bairdiella chrysoura</i>	x	x				
Perch, white	<i>Roccus americanus</i>	x	x				
Perch, yellow	<i>Perca flavescens</i>	x	x				

¹/The assistance of W. H. Massman and A. L. Pacheco in making available the results of their long experience with the pound-net fishery is acknowledged gratefully.

are young fish (McHugh et al 1959) predominantly age-group II (in their second year of life) in spring and early summer, and age-group I (for their first year) in late summer and fall. In 1958, age-group I fish were exceedingly abundant in Virginia: small schools were seen everywhere in the estuaries through spring and summer, and mass mortalities, a common phenomenon when a species becomes unusually abundant, were reported from many areas; these fish showed up in late summer as a dominant feature of pound-net catches in the York River area, although they were of a size that could escape through the meshes of the nets quite easily, and very few older fish appeared in samples after mid-August. The excellent catches in the menhaden purse-seine fishery in 1959 undoubtedly included large numbers of fish of the 1958 year-class. Growth of these fish in length and weight, and their relative importance in numbers and total weight each month in 1958, are illustrated in figure 1. Samples of the 1958 year-class, caught in experimental trawls or taken by other methods, are included as polygons enclosed by broken lines on a different vertical scale.

Thread herring (*Opisthonema oglinum*):

Almost half the samples examined in 1955 and 1958 contained thread her-



ring, which first appeared in catches early in June and disappeared late in September. Hildebrand and Schroeder (1928) observed that this species appeared in the Bay about mid-May and left during October, that its spawning habits were almost completely unknown, and that fish taken in spring were thin and poor, whereas in fall they were fat. Thread herring taken in 1958 were quite uniform in size, but although mean fork length increased only slightly from spring to fall, weights increased substantially (fig. 2, p. 9). Gonads of fish caught in June were mostly in prespawning condition. In July most fish were spent or recovering from spawning, or were apparently immature, probably having recovered completely from a late spring or early summer spawning. In August and September all gonads were spent or in a resting condition. Apparently thread herring, like most other fishes, become thin and poor at spawning time but recover and fatten

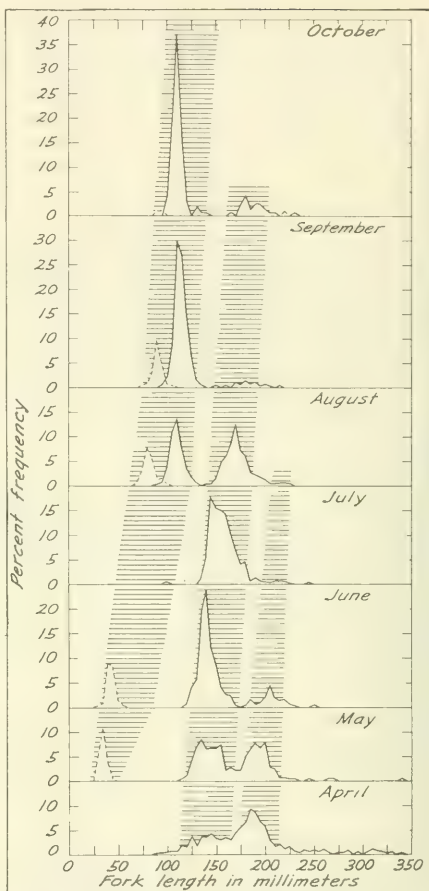


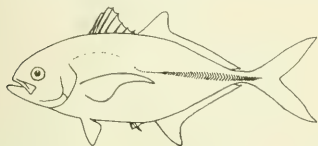
Fig. 1 - Frequency distributions of fork lengths of menhaden in samples of scrap fish from pound-net catches in the York River area, Virginia, 1958. Shaded zones emphasize the progression of size groups to the right as the season advances, and illustrate the growth of successive age groups of fish. Broken lines represent samples of young fish caught in experimental trawls.

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quickly. The increase in weight from spring to fall is substantial, of the order of 20 percent. Females were about 5 mm. ($\frac{1}{8}$ inch) longer than males, on the average.

Blue runner (*Caranx crysos*):

This small fish, a member of the jack family, was prominent in



pound-net catches in 1958, but relatively unimportant in 1954, and absent in 1955. It did not appear in 1958 until after the middle of August, hence its absence in 1955 may have been caused by inadequate sampling, for no samples were examined in that year between August 13 and November 26. Hildebrand and Schroeder (1928) reported that marketable sizes ($\frac{1}{3}$ to 1 pound) were taken in small numbers at Lynnhaven Roads, Va., but that smaller fish, 5 to 8 inches long, were less common than *Caranx hippos*, the common jack, of about the same size. This may mean that young blue runner penetrate farther into the Bay than older fish or than common jacks, or that young were especially abundant in 1958, for no larger fish and no common jacks were known to be taken in the catches sampled. Blue runner were seen in the Fulton Fish Market, New York City, in September 1958, and dealers there say that there is a limited market for them, especially among southern Europeans, who find them similar to the "sardine" of the Mediterranean Sea.

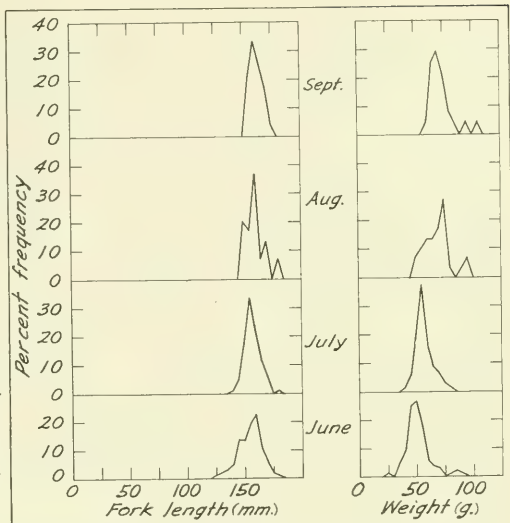


Fig. 2 - Frequency distributions of fork lengths and weights of thread herring in samples of scrap fish from pound-net catches in the York River area, Virginia, 1958.

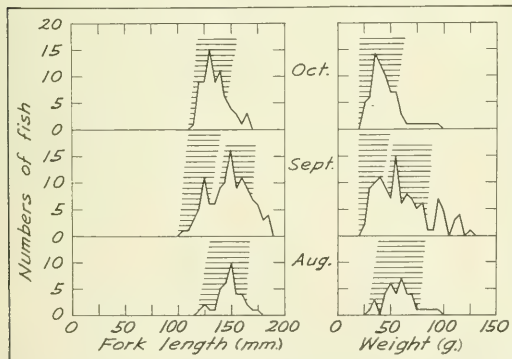


Fig. 3 - Frequency distributions of fork lengths and weights of blue runner in samples of scrap fish from pound-net catches in the York River area, Virginia, 1958. Shaded zones illustrate the presence of two size groups of fish.

Blue runner in scrap from York River pound nets ranged in fork length from about 105 to 185 mm. (4 to 7 inches), and thus corresponded in size to the 5- to 8-inch (total length) fish reported by Hildebrand and Schroeder (1928). Those seen in the New York City market in 1958 were of similar size. All fish examined in 1958 were immature, and size-frequency distributions (Fig. 3) suggest that two successive age groups dominated the catch: the first, with modal length increasing from 150 to 170 mm., in August and September, the second 125 to 130 mm., in September and October.

Alewife (*Alosa pseudoharengus*):

Atlantic coast, 1957: 57,206,000 pounds, valued at \$686,000.

Alewives apparently are less important in the York River fishery than elsewhere in Virginia, and those caught in this area are not sold or processed in any great numbers as human food. In certain areas, especially the Rappahannock River, considerable numbers are salted or pickled, and the roe is separated and canned. In 1958 few alewives appeared in York River pound-net catches after the end of April. In fork length these fish fell into three groups (fig.

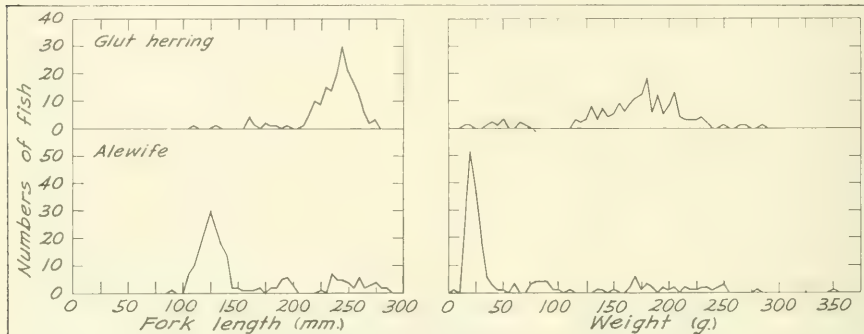


Fig. 4 - Frequency distributions of fork lengths and weights of alewife and glut herring in samples of scrap fish from pound-net catches in the York River area, Virginia, 1958.

4), with modes at 125, 195, and 235-260 mm. (5, 8, and 9-10 inches), and 20, 85, and 170 to 250 g. ($\frac{1}{25}$, $\frac{1}{5}$, and $\frac{2}{5}$ -pound), and probably were 1, 2, and 3 or more years old, respectively (Hildebrand and Schroeder 1928).

Glut herring (*Alosa aestivalis*):

Atlantic coast, 1957: landings included in figures for alewife.



Glut herring entered and left the pound-net fishery in spring perhaps a little later than alewives. Those examined in scrap samples in 1958 were larger on the average than the alewives (fig. 4). They fell into two groups according to size, with modes at about 160 and 245 mm. fork length ($6\frac{1}{2}$ to 10 inches), and 50 and 180 g. ($\frac{1}{10}$ - to $\frac{2}{5}$ -pound), and probably were 2 years and 3 years and older, respectively. Glut herring and alewives were among the most important pound-net species in spring, but because the fishery is seasonal they were later superseded in rank by others.

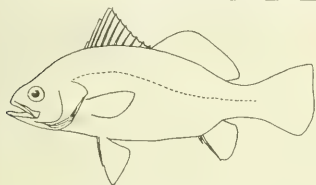
Bigeye scad (*Trachurops crumenophthalma*):

This small jack was almost as prominent in 1958 York River pound-net catches as blue runner, and entered the fishery at about the same time. This may explain its absence from 1955 samples which did not cover the late summer period. In 1954, however, samples were taken weekly until the end of September yet no scad were seen, which suggests that the species was less abundant, and certainly less available, than in 1958. Like the blue runner, this is

primarily a southern fish, and its appearance in Chesapeake Bay may be sporadic, for Hildebrand and Schroeder (1928) saw it only once. In 1958 scad were fairly uniform in size, but smaller fish were more frequent in October (fig. 5). Fork lengths ranged from about 105 to 160 mm. (4 to 6½ inches), and weights from 15 to 70 g. (½ to 2½ ounces). Bigeye scad of about this size were seen in the New York City market in September 1958, where they, like blue runner, are favored by certain customers because they resemble Mediterranean "sardines."

It is somewhat surprising that southern species like scad and blue runner should be unusually abundant in the Chesapeake and Middle Atlantic regions in 1958, for water temperatures along the coast were reported to be unusually low all summer. The 1958 menhaden purse-seine fishery was unusually successful in Chesapeake Bay but poor farther north. Perhaps scad and blue runner, like menhaden, became concentrated in the Chesapeake region rather than spreading out along the Middle Atlantic coast because water temperatures were too low farther north.

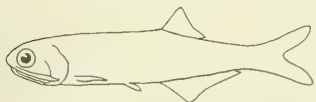
Silver perch (*Bairdiella chrysura*):



ver perch caught in York River pound nets were included in scrap. They were probably in their third summer (Hildebrand and Schroeder 1928) with average length less than 175 mm. (7 inches) and average weight less than 75 g. (⅔ -pound).

Bay anchovy (*Anchoa mitchilli*):

This anchovy is one of the most abundant fishes in Chesapeake Bay, undoubtedly important as food for many other species. Although it can escape easily through pound-net meshes, some fish are caught when



schools stray into the nets. It is possible that some anchovies in pound-net scrap were regurgitated by larger fishes, but most were too fresh and undamaged to have

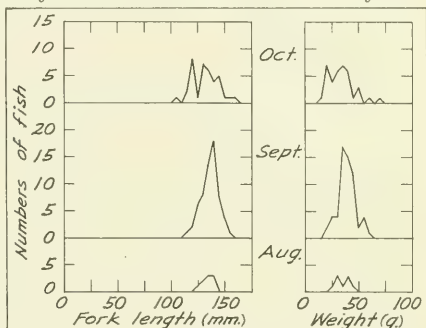


Fig. 5 - Frequency distributions of fork lengths and weights of bigeye scad in samples of scrap fish from pound-net catches in the York River area, Virginia, 1958.

This species appeared quite frequently, but usually in small numbers, in York River catches (fig. 6). Although silver perch are abundant in Virginia and the meat is of good flavor, demand is negligible, probably because the fish are small. All sil-

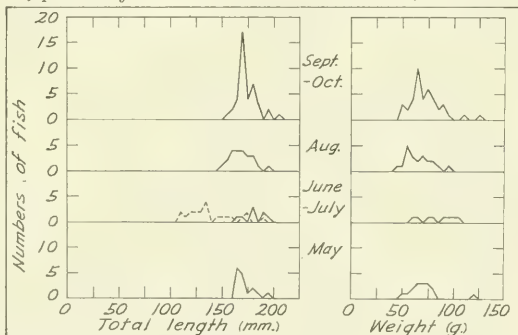


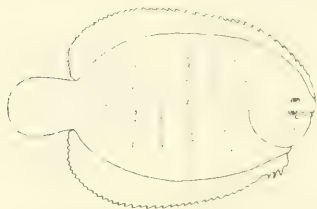
Fig. 6 - Frequency distribution of total lengths and weights of silver perch in samples of scrap fish from pound-net catches in the York River area, Virginia, 1958. The broken line in June-July represents a sample from the York River pound-net fishery examined in 1955.

peake Bay, undoubtedly important as food for many other species. Although it can escape easily through pound-net meshes, some fish are caught when schools stray into the nets. It is possible that some anchovies in pound-net scrap were regurgitated by larger fishes, but most were too fresh and undamaged to have

been caught in this indirect fashion. More than a third of all samples contained Bay anchovy, which, though an insignificant component of scrap by weight, was one of the principal species in terms of numbers caught. Fork lengths ranged from 53 to 72 mm. (about 2 to 3 inches).

Hogchoker (*Trinectes maculatus*):

Atlantic coast, 1957: 7,000 pounds, valued at \$421.

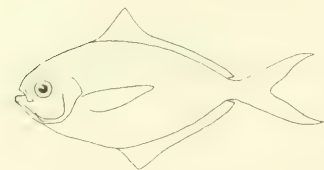


($\frac{1}{5}$ -pound). Mansueti and Pauly (1956) concluded that hogchokers in the Patuxent River, Md., grew slowly, reaching a mean standard length of only 131 mm. (total length about 159 mm.) and a weight of 80 g. (about $\frac{1}{5}$ pound) at the end of 7 years. If York River fish grow as slowly, these fish were from 3 to more than 7 years old.

FOOD FISH

Butterfish (*Poronotus triacanthus*):

Atlantic coast 1957: 10,267,000 pounds, valued at \$848,000.



This was the most important food fish in York River pound-net scrap in 1954, 1955, and 1958 (tables 1 to 3). Almost two-thirds by number and one-half by weight of all butterfish caught in the York River fishery in 1958 were sold as scrap (table 4), and the species was found in 86 percent of all scrap samples examined. Detailed studies have not been made of size composition of the entire catch of butterfish in Virginia pound nets, but examination of one sample from the food-fish catch suggested that there is considerable overlap in sizes retained for market or included in scrap (fig. 7, September). The smallest butterfish in all samples

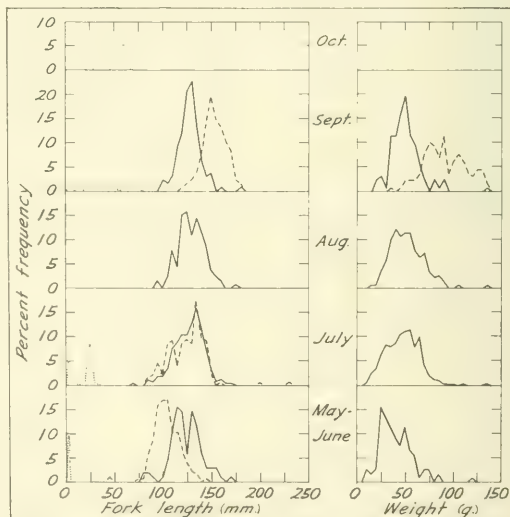


Fig. 7 - Frequency distributions of fork lengths and weights of butterfish in samples of scrap fish from pound-net catches in the York River area, Virginia, 1958. Dotted lines represent samples of young taken by Perlmutter (1939) near Long Island. Broken lines in May, June and July represent samples from the York River pound-net fishery measured in 1955. Broken lines in September represent a sample from the pound-net catch in 1958 after scrap butterfish had been culled out.

was 81 mm. ($3\frac{1}{4}$ inches) in fork length and weighed 10 g. ($\frac{1}{3}$ oz.); the largest 179 mm. and 136 g. (almost $\frac{1}{3}$ pound). Obviously, as Neville and Perlmutter (1941) observed in the Long Island fishery, sorting of the catch is not efficient; many fish of market-size are sold as scrap, and many small fish are not culled from those shipped to fresh fish markets. Fish dealers in the cities believe that this lack of attention to careful culling affects selling prices adversely.

Very little is known about butterfish, although it is a fairly important species from Chesapeake Bay north to New England. Perlmutter (1939), in the vicinity of Long Island, took young-of-the-year that ranged in total length from 2 to 94 mm. ($\frac{1}{10}$ to $3\frac{1}{2}$ inches) or 2 to 77 mm. fork length (fig. 7), and Bigelow and Schroeder (1953) estimated that fish caught off the New Jersey coast, ranging from 4 to $5\frac{1}{4}$ inches total length, were in their second year, and a group of larger fish, from $7\frac{1}{2}$ to $10\frac{1}{2}$ inches total length, were in their third summer, and some perhaps in their fourth. Hildebrand and Schroeder (1928) concluded that butterfish in Chesapeake Bay increased from a mean total length of 4 inches in May to about $5\frac{1}{4}$ inches in October. Spawning, as deduced from observations of gonad development, occurs in early summer in Chesapeake Bay. On this evidence we can assume that most butterfish in pound-net scrap in Virginia were in their second year of life, and most of those sold as food were in their third year or older.

Gray sea trout or weakfish

(*Cynoscion regalis*):

Atlantic coast, 1957: 8,150,000 pounds, valued at \$622,000.



This was the second most important food fish in scrap samples examined. It occurred in about three-quarters of all samples, and ranked fourth of all species by weight. Sizes were fairly uniform, and most fish probably were in their second year of life (Nesbit 1954), with a few in their third year or older early in the season, and a few larger yearlings in late summer (fig. 8). In spring and summer many of these small trout contained well-developed gonads, and it seems probable that they would have spawned that season. By number, more than one-quarter of the gray sea trout catch in the York River fishery was discarded as scrap (table 4).

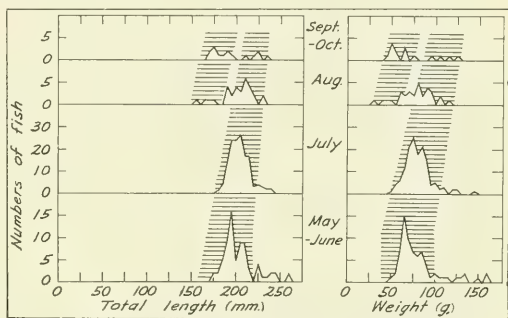
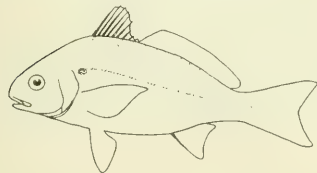


Fig. 8 - Frequency distributions of total lengths and weights of gray sea trout in samples of scrap fish from pound-net catches in the York River area, Virginia, 1958. Shaded zones emphasize the progression of size groups to the right as the season advances.

Spot (*Leiostomus xanthurus*):

Atlantic coast, 1957: 9,032,000 pounds, valued at \$623,000.



Spot also was an important food fish in pound-net catches, and young appeared rather frequently in scrap. More than two thirds of all scrap samples contained small spot, which almost equalled gray sea trout in numbers, although not in total weight. Spring catches contained two size groups of spot (fig. 9), probably fish in their second year and in their third

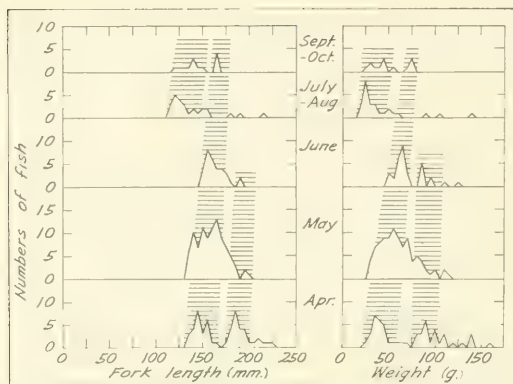


Fig. 9 - Frequency distributions of fork lengths and weights of spot in samples of scrap fish from pound-net catches in the York River area, Virginia, 1958. Shaded zones emphasize the progression of size groups to the right as the season advances.

Young bluefish were relatively important in 1958 samples of scrap from the York River, but less important in 1954. Their absence in 1955 may have been related to the pattern of sampling in that year for no samples were examined in late summer and fall. On the other hand, almost all bluefish in 1954 and 1958 were taken in May, June, or July, months equally well sampled in 1955. Bluefish are erratic in their movements, and their occurrence in the Bay in 1958 may have been governed by the same unusual temperature conditions that brought blue runner and bigeye scad to these waters in apparently unusual numbers. It has been reported that in 1958 bluefish were less abundant along the Middle Atlantic coast and appeared later than usual.

Bluefish in scrap were rather uniform in size, about 150 to 210 mm. (6 to 8 inches) fork length, and 45 to 125 g. ($\frac{1}{10}$ - to $\frac{1}{4}$ -pound). Average size tended to decrease through the fishing season, probably because younger fish appeared later.

Croaker (*Micropogon undulatus*):

Atlantic coast, 1957: 18,918,000 pounds, valued at \$1,943,000.



Young croakers were encountered in 7 out of 21 scrap fish samples in 1954 and ranked eleventh in number. In 1955 they were found in only 2 samples out of 14, and in 1958 in only 3 out of 25, and ranked fourteenth in number in both years. Total lengths of 32 fish from scrap samples examined in 1955 and 1958 ranged from 145 to 245 mm. (6 to 9 inches) and weights reached a maximum of 165 g. ($\frac{1}{3}$ -pound). Young croakers probably were more common in scrap in previous years when the species was more abundant, and their scarcity in 1958 was not unexpected in view of the absence of yearlings, born in fall and winter of 1957-58, from the waters of Chesapeake Bay and the estuaries in 1958, as observed by W. H. Massmann and his associates at the Virginia Fisheries Laboratory. Large catches of croakers were made in the spring of 1958, and it would be expected that small fish, if they had been present, would have been culled from these hauls.

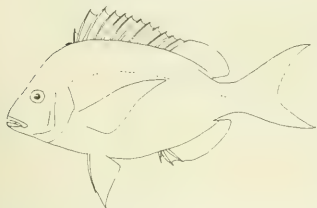
year or older (Pacheco 1957). The relative abundance of larger and older spot in scrap at this season probably reflects small catches of this species, typical of the spring fishery. When only a few individuals of edible size were taken they were not saved for market. By mid-summer most spot in scrap samples were young, nearing the end of their first year of life.

Bluefish (*Pomatomus saltatrix*):
Atlantic coast, 1957: 3,742,000 pounds, valued at \$493,000.



Scup (*Stenotomus versicolor*):

Atlantic coast, 1957: 34,108,000 pounds, valued at \$2,008,000.



Those taken in June and July (fork length 4 to 5½ inches) probably were in their second year of life, those caught in fall (fork length 7 inches) probably in their third year.

SUMMARY AND CONCLUSIONS

Many other species, some valued as food, others of little appeal, occurred in relatively small quantities in pound-net scrap (tables 1 to 7). If our examination of samples from the York River was at all representative, none of these minor species is caught in sufficient quantity to offer any great threat to the resource, but catches of some others, particularly butterfish, gray sea trout, and spot, are sufficiently large so that investigation of the effect of such removals upon future stocks of adult fish would be desirable. Some of the investigations now under way at the Virginia Fisheries Laboratory are laying the groundwork for solution of this problem.

It is pertinent to ask whether scrap fish now caught by pound nets and other fishing gear in Virginia are being put to best economic use. As long as there is no great shortage of protein food in the United States, preferences and prejudices will control economic value of fish to a great extent, but it appears that much of the choice as to whether a fish is scrap or human food rests with the primary producer or the middleman, and the consumer has little or no opportunity to choose. One cannot help but wonder whether some enterprising middleman might not profit, and the consumer benefit also, by experimental marketing of some of the scrap fish we have described, like blue runner, bigeye scad, silver perch, or hogchoker. It seems to be established that these fishes are quite palatable, and objections on the basis of size seem rather incongruous when such species as butterfish, equally small, apparently are in great demand. Displayed in attractive packages, as frozen-dressed panfish, irrespective of species, these now-despised varieties might find a ready market. Economic effects of fluctuations in abundance of individual species would be minimized by selling under a general, rather than a specific, name, and other species that appear only spasmodically might be marketed equally well.

One rather formidable obstacle to development of methods to allow small fish to escape the nets, or to utilize scrap for human food, is presented by the crab-pot

This species does not enter Chesapeake Bay in great numbers, and most Virginia landings are caught in the ocean by trawlers. Nevertheless, a few are taken by pound nets in the lower part of the Bay, and some of these enter the scrap. Scup occurred in about 1 of every 4 samples examined in 1955 and 1958, but not at all in 1954. Catches were distributed more or less randomly through the fishing season, but there were striking seasonal changes in size and probably age of fish in 1958 (table 8).

Table 8 - Frequency Distributions of Fork Lengths and Weights of Scup (*Stenotomus versicolor*) in Pound-Net Scrap, York River, Virginia, 1958.

Fork Length mm.	Numbers of Fish				Weight G.	Numbers of Fish			
	June	July	Sept.	-Oct.		June	July	Sept.	-Oct.
					15	1	-	-	-
					20	1	-	-	-
					25	3	-	-	-
					30	2	-	-	-
					35	-	-	-	-
					40	-	-	-	-
					45	-	-	-	-
					50	-	1	-	-
					55	-	-	-	-
					60	-	1	-	-
90	1	-	-	-	65	-	-	-	-
95	-	-	-	-	70	-	-	-	-
100	1	-	-	-	75	-	-	-	-
105	2	-	-	-	80	-	-	-	1
110	3	-	-	-	85	-	-	-	-
115	-	-	-	-	90	-	-	-	-
120	-	-	-	-	95	-	-	-	-
125	-	-	-	-	100	-	-	-	-
130	-	-	-	-	105	-	-	-	-
135	-	1	-	-	110	-	-	-	1
140	-	1	-	-	115	-	-	-	4
145	-	-	-	-	120	-	-	-	1
150	-	-	-	-	125	-	-	-	3
155	-	-	-	-	130	-	-	-	-
160	-	-	-	-	135	-	-	-	1
165	-	-	-	-	140	-	-	-	2
170	-	-	4	-					
175	-	-	6	-					
180	-	-	3	-					

fishery. Demand for scrap as bait is so strong that at times we were unable to secure samples for scientific study. Yet there are several ways in which a steady and more convenient supply of bait could be provided, e. g. by freezing menhaden in blocks of suitable size, or developing a prepared bait of uniform quality and high attraction power. If such developments are not forthcoming there may be no unanimous support for scientific measures designed to create an optimum sustained yield of food fishes, no matter how well-founded such measures might be.

Some of the conclusions drawn in this investigation may be too sweeping in view of the limited area of sampling and the knowledge that many species are not distributed uniformly through the waters exploited by the pound-net fishery. Catches in other areas certainly should be examined if this study is to continue, and it would be well also to secure information on relative quantities and species composition of scrap taken in haul seines and other gears.

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POSSIBILITIES FOR APPLYING FISH OIL TO ORE FLOTATION

By M. E. Stansby*

ABSTRACT

This is a report of a trip made to iron-ore-concentration plants in Michigan and Minnesota for the purpose of learning what possibilities there are for using fish oils in the flotation of ore.

INTRODUCTION

In an attempt to apply fish oils or fish-oil derivatives to the flotation of ores, especially iron-ores, the U. S. Bureau of Commercial Fisheries has been carrying on cooperative research since 1955 with the School of Mines and Metallurgy, University of Minnesota. Results of this research have shown that fish-oil fatty acids can be highly effective for such flotation. With iron ore, fish-oil fatty acids (because of their high degree of unsaturation) are especially effective in a reverse type of flotation in which the silica is floated away from the iron in place of the more usual flotation of the iron from the silica.

The principal deposits of iron ore in the United States are located in Minnesota and in northern Michigan, with the deposits in Minnesota being the more important. In June 1959, a visit was made to several iron-mining concerns and their research laboratories in Michigan and Minnesota. The objectives of this visit were: (1) to learn whether or not the flotation process for concentrating iron ore is being expanded and, accordingly, whether or not the possibility of using fish oils as flotation agents is increasing and (2) to engender further interest by the iron ore-concentration industry in the Bureau's fish-oil research program, possibly to the extent that the research laboratories of the industry might investigate the use of fish oils.

The purpose of this report is to describe the findings of this trip and to inform the fish-oil industry of future possibilities for marketing their product for the flotation of ore.

EARLY USE OF FISH OIL IN ORE FLOTATION

It has been known by Bureau personnel and the fish-oil industry that many years ago fish oils were employed as flotation agents for concentrating various ores, but no specific details were available.

From a metallurgist at one concern, information was obtained on such early use of fish oils at a phosphate-flotation plant in Florida that had for many years been using menhaden and sardine fatty acids. In 1937, however, the price of fish-oil fatty acids reached about 12 cents a pound, which the management considered to be too expensive for their operation. They therefore looked into the use of tall-oil fatty acids, which had been tried earlier without success. Since tall oils in 1937 were selling for only about 2 cents a pound, research was carried out with them

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Fig. 1 - Experimental ore flotation employing fish-oil fatty acids is being carried out at School of Mines and Metallurgy, University of Minnesota.

and, eventually, a way of using tall oils was found. This concern then changed from fish-oil to tall-oil fatty acids.

In 1938, another concern, in Cuba, who employed this same metallurgist, used fish-oil fatty acids for the flotation of manganese ore. In that year this concern changed to tall-oil fatty acids because the latter was much lower in price.

MICHIGAN IRON ORES

In Marquette County, Mich. (on the upper Michigan peninsula), specular hematite ores, or specularite, were mined extensively from 1871 to 1937. By the latter date, most of the ores of higher grade had been exhausted, and many mines were abandoned. In 1947, a large iron-mining company began investigation of the possibility of reclaiming, by flotation, some of the lower grade iron ores still available in this region in large quantities. Eventually a joint operation was set up by several large iron-mining concerns. A small plant with a capacity of 300,000 tons of concentrate a year was opened at Humboldt, Mich., followed shortly, in 1956, by construction at Republic, Mich., of a plant with a capacity of 600,000 tons a year. The capacity of the Humboldt plant is now being doubled, and that of the Republic plant is being considered for doubling.

In addition to these two, a concentration plant with a capacity of 750,000 tons a year is operated by another company at Groveland, Mich. Much of the output of this plant is concentrated by spiral gravity methods, but a part of the output is concentrated by flotation.

As an example of the quantity of fatty acids used in these operations, one plant uses 1.2 to 1.5 million pounds annually.

SPECIFICATIONS FOR FLOTATION AGENTS: Several desirable characteristics for fatty acids to be used for flotation of iron ore were mentioned by industry personnel. A low titer (concentration of a substance in solution) is desirable, preferably 1° to 6° C. (33.8° - 42.8° F.). The desirable iodine value will depend upon the particular flotation process employed. At the Republic plant, values between 110 to 140 were considered optimum; some success had been obtained with fatty acids having iodine numbers as low as 100, but the higher range is considered to be preferable. The Republic and Humboldt plants currently are using tall-oil fatty acids as flotation agents.

POSSIBILITY FOR MARKETING FISH OILS FOR MICHIGAN SPECULARITE FLOTATION: Michigan specularite ores are relatively easy to float, so the choice of agent to obtain selective flotation does not appear to be critical. It was for this reason, undoubtedly, that flotation was applied on a large scale to these ores, since little research in finding a flotation procedure was required. Because the characteristics of potential flotation agents are not critical, the principal item that purchasers of these materials are apt to consider is price. Fish-oil fatty acids that can be prepared and sold at prices competitive to tall-oil fatty acids (currently selling at $7\frac{1}{4}$ to $8\frac{1}{2}$ cents a pound f.o.b. factory in Florida or West Virginia, with cost of transportation adding $1\frac{1}{2}$ to $1\frac{3}{4}$ cents a pound to these costs) should have a good chance for use in the ore-flotation industry. These prices are less than those at which most fish oils are currently selling. Some fish oils that are selling at 4 cents a pound, however, could very likely be processed to fatty acids and still be competitive with tall oil. This is particularly true if the bulk (nonfractionated) fatty acids can be employed with these types of ores and if the fish-oil fatty acids are found to be highly efficient. The Bureau is running tests on the efficiency of bulk fatty acids from some of the cheaper fish oils for specularite flotation and consequently for possibly greater recovery of this highly important and strategic American resource.

The possibility that the odor of fish oil would be objected to by the ore industry remains to be settled. Direct inquiry as to whether this would be a factor resulted in negative replies. One metallurgist who 25 years ago used fish-oil fatty acids for flotation said that he never had any complaints based upon odor during his use of those materials. Others in the field of iron-ore concentration stated that they would anticipate no serious drawback to the use of fish-oil fatty acids based upon odor. In contrasting to this opinion is the fact that at a commercial flotation plant one of the metallurgists pointed out the lack of odor in the tall-oil fatty acids and commented unfavorably on the odor of some fish-oil fatty acids with which he had been experimenting.

MINNESOTA IRON ORES

NONMAGNETIC TACONITE ORES: The Mesabi Range in Minnesota has been the principal source of iron ore in the United States for many years. It has contained relatively large quantities of high-grade iron ores that can be used without concentration, but they are approaching exhaustion. The high-grade ores are mixed with much vaster quantities of lower grade ores, which are just starting to be concentrated by a magnetic process. Two huge magnetic-process plants costing several hundred million dollars each are now in operation. Not all of the ores of lower grade in the Mesabi Range can be used in this magnetic process, since only the taconite ores possessing magnetic properties are suitable. A considerable quantity of nonmagnetic taconite ore is available, some of which has considerably higher iron content than have the magnetic ores presently being utilized. Furthermore, many millions of tons of these nonmagnetic taconite ores of relatively high iron content have been shoveled away from the surface in order to get at the ores of higher grade beneath. These intermediate-grade nonmagnetic taconite ores are placed in piles containing as much as 7 million tons awaiting the time when they can be concentrated.

In addition to the problem of how the nonmagnetic taconite ores could be concentrated, a more serious barrier to such use has existed. Iron ores are a low-priced commodity, worth only about 7 dollars a ton at the mine. Of this amount, sometimes as much as 2 dollars a ton or more has to be paid for various state taxes. A special concession was made by the State of Minnesota in the case of the magnetic taconite ores of very low iron content whereby most of those taxes were waived in order to permit the ores to be utilized. No such tax concession has existed for the so-called semitaconite ores, including the nonmagnetic type. Until those taxes were waived, the cost of any type of concentration was far in excess of what was economically feasible.

The Legislature of the State of Minnesota in June 1959 altered the tax laws to place the nonmagnetic semitaconite ores in the same preferred tax class as the magnetic taconites. Thus, for the first time, the utilization of this type of ore is feasible.

Two means are available for concentration of the nonmagnetic taconites. They can be roasted and thereby converted to the magnetic form, which can be magnetically concentrated, or they can be subjected to flotation. Flotation is the simpler, possibly cheaper process. Yet it has the disadvantage that some of the nonmagnetic taconites are not readily separated by the usual flotation processes, so the choice of the best flotation agent may be highly critical. Current research with fish oils in flotation of these nonmagnetic semitaconite ores should show whether fish oils are sufficiently efficient to warrant their use.

In June 1959, personnel at two concerns were definitely planning to concentrate nonmagnetic taconite ores. Neither concern was ready to go into operation even on a pilot-plant scale, for they were still carrying out laboratory investiga-

tions. One of these firms seemed to be inclined toward flotation rather than roasting; the other one was inclined toward roasting but had not made a final decision.

It would seem that fish-oil fatty acids might have a better chance for application as ore-flotation agents in the concentration of Minnesota nonmagnetic taconites than in the concentration of Michigan specularites, owing to the greater importance in the former case of the efficiency of the reagent. At present, however, there are no plants operating a flotation plant for the nonmagnetic taconites, so this is a possibility contingent upon favorable future developments.

MAGNETIC CONCENTRATES: Another possibility for future application of fish oils in ore flotation would occur if future developments in the iron-ore industry should require a further removal of silica from the iron-ore concentrate than is possible by magnetic methods. The iron and steel industry has been requiring ore of lower and lower silica content. If this trend continues, a point will eventually be reached where the only possibility for achieving the required low content of silica will be to use flotation after magnetic concentration. One of the operators of plants for the magnetic separation of iron ore is convinced that this use of flotation will eventually be adopted.

For such a use, the inverse process employing fish-oil fatty acids would be ideal. In the inverse flotation procedure, silica is floated from the iron ore. Because silica is already quite low in a magnetically-concentrated ore, this inverse process would be the most efficient way to effect the separation.

This combined magnetic and flotation concentration of ore will not be adopted in the near future. Therefore, there is no immediate possibility of selling fish oils for such a process. If, however, this procedure becomes a reality, it is likely to offer the greatest possibility for introducing fish oils into ore flotation.

NONFERROUS ORES

Although most of the research in the Bureau's cooperative program with the University of Minnesota's School of Mines and Metallurgy has dealt with iron-ore flotation, some preliminary tests with nonferrous ores indicate that fish oils might have application in the flotation of other materials. For example, good results were obtained in flotation of fluorite ores. Since flotation is more firmly established as a concentration method for nonferrous ores, the fish-oil industry should not overlook the possibility of marketing their oils for such nonferrous flotation purposes.

SUMMARY

1. Problems in concentrating iron ore vary enormously from one geographical area to another. Consequently, the possibilities for applying fish oils as flotation agents differ in the various ore-producing areas.

2. Possibilities for applying fish oils to flotation depend on whether the present or the future is being considered. For the present, fish oils may have little advantage over other ore-flotation agents, since price appears to be the factor determining the choice of agent used. If the future is considered, however, possibilities for the use of fish oils are greater, since there is likelihood that they will be evaluated on the basis of the efficiency of their action rather than on the basis of their price.

3. Flotation is an expanding means for concentration of Michigan specularite ores, and three plants are in commercial production. This ore is highly amenable, however, to being concentrated by flotation. Probably only the currently cheapest fish oil would have a chance for use.

4. Owing to changes made in June 1959 in Minnesota tax laws, it now has become feasible to consider concentration of certain nonmagnetic taconite ores. Although these ores are much more difficult to float than the Michigan specularite ores, many leaders in the iron-ore concentration industry are considering flotation operations. In these difficult operations, fish oils may well have advantages.

5. It is the view of some leaders in the industry that the magnetically-concentrated iron ore may eventually have to be further concentrated. Personnel in one of the concerns currently operating huge magnetic concentration plants tend to the view that in some years hence flotation will be used in conjunction with magnetic concentration. In such an operation, the use of fish oils in the reverse process where silica is floated from the iron ore may present the best possibility.

6. Need exists for the fish-oil industry to further acquaint the iron-ore industry with the properties of fish oil that might be useful in the flotation of iron ore.

7. The possibilities for applying fish oils as ore-flotation agents in noniron-ore concentrations should not be overlooked. These possibilities include, for example, the use of fish oil in the flotation of phosphate and fluorite ores.

Note: The author gratefully acknowledges the aid given by Fred D. DeVaney, Pickands Mather & Company, Duluth, Minn.; Stephen E. Erickson, The M. A. Hanna Company, Nashauk, Minn. and R. W. Livingston, Jones and Laughlin Steel Corporation, Calumet, Minn.; Ossi E. Palasvirta, Oliver Iron Mining Company, Duluth, Minn.; Gordon H. Palanch, Pickands Mather & Company, Research Laboratory, Hibbing, Minn.; L. L. Erck and Walter Nummela, The Cleveland-Cliffs Iron Company, Ishpeming, Mich.



LOBSTER'S PROTECTIVE SYSTEM

If a lobster is seized by the claws, it can throw off the arms bearing the claws at a point between the second and third segments of the arms. If the shell on some part of an arm is crushed and the lobster is bleeding, it will often cast off its claw at this point. At the joint between the second and third segments of the arm the claw breaks off easily and there is a special arrangement for preventing bleeding. However, if the arm is broken in some other spot much bleeding occurs. After the old claw is thrown off a soft bud grows out from the second joint of the arm, and when the lobster molts the new claw increases greatly in size and becomes covered by a shell. It takes three or four molts, however, for a new or regenerating claw to reach its normal size again.

The smaller legs also may be cast off but not so readily as the large claws. These small legs and other appendages, such as the feelers and the swimmerets, also can be regenerated.



COMPOSITION OF FISH AND SHELLFISH

In the composition studies conducted in 1959 at the U. S. Bureau of Commercial Fisheries Technological Laboratory, Seattle, Wash., major attention was given to marine fish of the Pacific Coast. One study on meals was completed, and plans have been made to start the investigation of shellfish beginning with Dungeness crab.

Three investigations have been completed. The work on halibut showed it to be uniformly low in both oil and sodium and high in protein. A survey of the sodium content of fish meat indicates that salt-water fish in general are not significantly higher in sodium content than are fresh-water fish provided they have not been in contact with brine or other sources of sodium.

In a study of fish meals, it was found that the carbonate content was less than 2 percent and ranged as low as 0.5 percent. Shellfish meals on the other hand showed large variations, reaching 25 percent for shrimp and 75 percent for clams. The first two reports were presented at national meetings of scientific associations and all three have been submitted for publication.

Three projects are nearing completion. A long-term study of Pacific ocean perch and several other species of rockfish show a uniform composition regardless of species, season of capture, and area of capture. A similar study on sole, including 10 species, shows a wide variation in composition. They are much lower in protein and higher in sodium than are rockfish. Much of the analytical work for the Terminal Island project on a sampling method for tuna was done in this laboratory.

Three other projects are well under way or planned for the near future. The composition of tuna is being studied. Two series of albacore, one of skipjack, and several bluefin and yellowfin specimens have been analyzed. Of all fish tested, tuna meat is highest in protein and lowest in sodium, but it shows a large fluctuation in oil content. A proposed three-year program on the study of silver salmon has been started. Samples have been prepared from 4 series of specimens obtained during the 1959 fishing season. Plans have been made to start investigations on the composition of shellfish, beginning with Dungeness crab in January.



CONTROL OF DRIP IN CHILLED AND FROZEN FISHERY PRODUCTS

Free liquid or juice that exudes from fishery products during refrigerated storage or during the defrosting of the frozen product may be (1) water native to the product, (2) water picked up during handling and processing, and/or (3) water added as a protective glaze. When present in excessive amounts, the free liquid may become a problem to the fish producer, buyer, and consumer. The general objectives

of this project are to investigate the factors that affect water retentivity of various frozen fishery products and to find means of determining the amount of native water in contrast to amounts of water picked up during processing or added as glaze.

The first phase consists of determining some of the constituents of thaw drip or juice that exudes from defrosted cod fillets that have been frozen and stored for various time intervals at 0° F. and $+20^{\circ}$ F. The constituents being determined include total solids, total nitrogen, protein nitrogen, ash, sodium, potassium, calcium, phosphorus, magnesium, and sulfate. Results are still insufficient to draw any conclusions at this time.



FISH FLOUR RESEARCH

For research being conducted on fish flour at the Bureau's Technological Laboratory, College Park, Md., samples of whole fish, fillets, and the remaining fillet waste were obtained from a single lot of ocean perch. These samples were frozen separately and half of each was processed into fish flour by an acid precipitation technique. The remaining half of each of the samples was processed into fish flour by an azeotropic distillation technique by the VioBin Corporation at Monticello, Ill.

The ocean perch fillets first were ground while still frozen and then were processed into a coarse, dry form in the pilot plant. This material then was extracted three times with a patented solvent, dried thoroughly in an air stream, autoclaved, dried again, and milled. This process was repeated using the whole fish and then again using the fillet waste.

Samples of each of the flours were taken aseptically during the final drying stage for bacteriological analyses. Total plate counts and *E. coli* determinations will be conducted to aid in evaluating the "sanitary condition" of the product.

The fish flour pilot plant is only one of the installations of the VioBin Corporation at Monticello. There is a commercial-scale batch fat extractor for the final defatting of dried beef pancreas, beef liver, and fish meal. Each of the above products first is dried using the azeotropic processing technique either in the pilot plant at Monticello or in one of several other plants. The beef products are sold to pharmaceutical houses for the preparation of enzymes, etc., and the latter product is milled and sold as fish flour. Fish flour made from fish fillets is sold to pharmaceutical houses and all other fish flours are sold for export. Apparently there is at least a limited market for fish flour at the present time.

--By Caroline H. Kurtzman,
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LOW STORAGE TEMPERATURES HELP MAINTAIN FILLET QUALITY

Frozen pollock fillets lose quality very rapidly at high storage temperatures, according to a preliminary report from the U. S. Bureau of Commercial Fisheries Technological Laboratory in Gloucester, Mass.

Temperatures of $+10^{\circ}$, 0° , and -20° F. have been used in tests on one-pound packages of pollock fillets. The fillets became completely inedible in less than two

months when stored at 10° F. At 0° F. this product had a storage life of about six months, or more than three times that of the fillets stored at the higher temperature. At lower temperatures the keeping quality is increased even more significantly. For example, pollock fillets stored at -20° F. for six months showed no measurable change in quality.

The results of these tests, which are still in progress, emphasize again the importance of storing fish at temperatures of 0° F. or lower in order to insure the marketing of a high quality product. Also, the results show that the necessity for low-temperature storage increases as the length of the storage period is increased.



PROPOSED STANDARDS FOR GRADES OF FROZEN RAW HEADLESS SHRIMP UNDER REVIEW

Two series of industry meetings were held during October 1959 with producers, users, and marketers of frozen raw headless shrimp, and scientists of the U. S. Bureau of Commercial Fisheries to discuss the first draft of the proposed standards for Federal grade of frozen raw headless shrimp. The first meetings were held in Brunswick, Ga., and Tampa, Fla. Two weeks later, meetings were held in New Orleans, La., and Corpus Christi, Tex. Approximately 40 industry members attended the four meetings.

The spirited discussion of the draft of the proposed standards provided the background needed for further revision. A new working draft, along with a draft copy of Instructions to the Inspector, was sent out to the 16 Bureau inspectors working in shrimp breeding plants. Through the cooperation of these inspectors and of the plants in which they are stationed, the standard can be given a thorough in-plant application and evaluation prior to the preparation of the final draft.

It was expected that the provisional draft would be ready for publication in the Federal Register during February 1960.



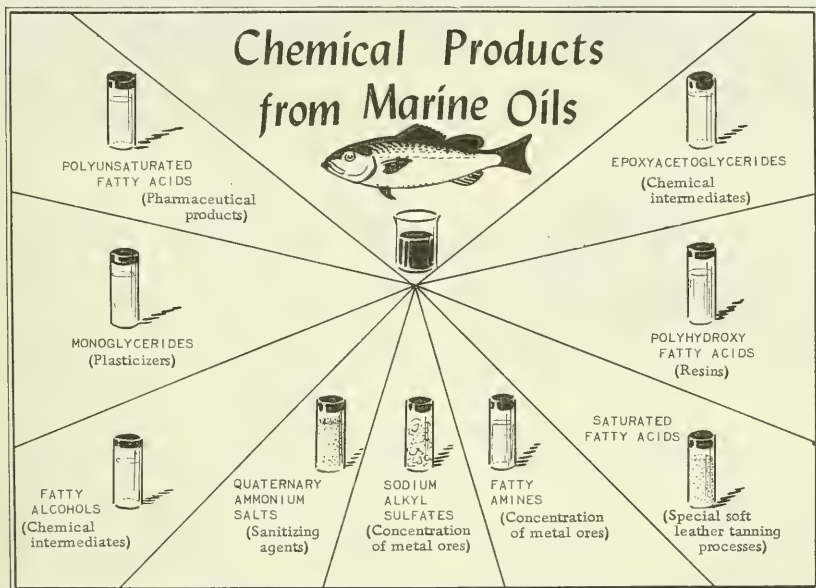
PURIFIED FISH-OIL FRACTIONS TO BE MADE AVAILABLE FOR RESEARCH

Following up successful research findings by the U. S. Bureau of Commercial Fisheries on the usefulness of fish-oil fractions in reducing high blood-serum cholesterol levels in animals, Assistant Secretary of the Interior Ross Leffler announced on December 29, 1959, the details of a stepped-up research and technical assistance program.

He explained that the plans include making available to interested medical and pharmaceutical researchers relatively large samples of purified fish-oil fractions and the screening of 25 species of edible and industrial fish to determine whether the types of fatty acids present in those fishes are those useful in dietary and medical treatment of elevated cholesterol levels.

Other investigators are studying the effects of highly unsaturated oils on fat utilization by the body as well as the amount of dietary fish oil necessary to cause a useful reduction in serum-cholesterol levels. Nutritional advisory services by the Bureau on fish oils and edible fish products are being made freely available to dietitians and medical researchers engaged in formulation of special anticholesterol diets.

The Director of the Bureau stated that his staff has received many expressions of interest from researchers in utilizing fish oils and fishery products for human

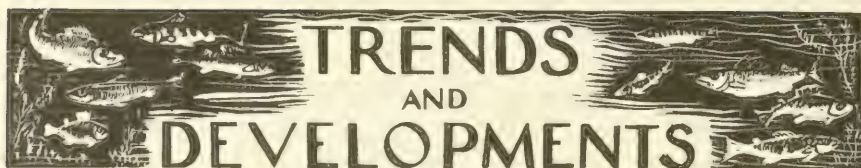


feeding trials. Large quantities of these oil fractions have not been available. To remedy this situation, the Bureau is undertaking the preparation of such oil fractions utilizing a pilot-scale centrifugal molecular still and will make oil samples available, free of charge, to responsible researchers.

The key findings of recent research which the Bureau hopes will encourage full-scale clinical testing by responsible medical staffs are (1) the abundance of what are known as "unsaturated" fatty acids in the body oils of many species of fish, (2) proof that the feeding of these "unsaturated" fatty acids to test animals reduced the highly elevated content of cholesterol in their blood sera to "normal" levels, and (3) that the more "unsaturated" the fatty acid used, the more effective it was in normalizing levels of serum-cholesterol.

This latter finding was of most immediate interest to fishery researchers since fish-oil fatty acids contain up to six points of unsaturation as compared to two points of unsaturation in linoleic acid, the active cholesterol-depressant agent in vegetable oils. Use of a properly prepared concentrate of these highly unsaturated fatty acids from fish would permit effective anticholesterol treatment with a minimum of added fat intake.

Bureau technologists pointed out that these unique "soft fat" features of fish oils make fishery products especially valuable for inclusion in diets designed to bring about a better nutritional "balance" between the hard and soft fats in the American diet. Many medical authorities have pointed out the desirability of increasing soft fat consumption while reducing the consumption of hard fats as a possible means of controlling blood-cholesterol levels.



TRENDS AND DEVELOPMENTS

American Samoa

TUNA LANDINGS, JANUARY-NOVEMBER 1959:

Species	November		Jan.-Nov.	
	1959	1958	1959	1958
	..... (1,000 Lbs.)			
Albacore	2,460	1,712	19,819	19,799
Yellowfin	161	239	3,779	+924
Big-eyed	93	42	919	1,007
Skipjack	7	-	14	-
Total	2,721	1,993	24,531	25,730

Note: Most of these tuna were landed by Japanese vessels; a small amount by South Korean vessels.



Byproducts

U. S. FISH MEAL AND SOLUBLES SUPPLY, 1950-59:

The production of 385,000 short tons of fish meal and solubles in the United States plus imports of 144,500 tons of fish

Table 1 - U. S. Supply of Fish Meal and Solubles, 1950-59

Year	U. S. Production ¹		Imports ²		Total
	Short Tons	Percent	Short Tons	Percent	Short Tons
1959 ³	385,000	72.7	144,500	27.3	529,500
1958	313,228	74.3	108,383	25.7	421,611
1957	325,221	79.0	86,442	21.0	411,663
1956	360,207	79.6	92,093	20.4	452,300
1955	319,962	76.3	99,544	23.7	419,506
1954	314,482	68.0	147,777	32.0	462,259
1953	238,851	64.5	131,473	35.5	370,324
1952	221,403	52.1	203,539	47.9	424,942
1951	209,756	62.0	128,478	38.0	338,234
1950	239,954	79.0	63,855	21.0	303,809

¹ Includes homogenized-condensed fish and fish solubles.

² Includes fish solubles

³ Partly estimated.

Note: Wet weight of solubles and homogenized-condensed fish have been converted to dry weight by reducing their roundage by one-half.

solubles added up to a record supply in 1959. The United States production in 1959 was 31.5 percent above the 10-year average (1950-59), and imports exceeded the average by 19.8 percent. The overall supply (United States production plus imports) was 28.1 percent above the 10-year average for the 1950-59 period.

U. S. PRODUCTION OF FISH MEAL, FISH SOLUBLES, AND HOMOGENIZED-CONDENSED FISH:

Fish Meal, 1958-59: Based on partially-estimated production statistics, the United States production of 295,000 tons of fish meal in 1959 will be close to the previous record production of 295,793 tons in 1956. Fish meal produced from menhaden in 1959 (219,000 tons) was up about 4.0 percent from the 210,582 tons produced in 1956.

Table 2 - U. S. Production of Fish Meal, 1958-59				
Product	1959 ¹	1958	Record Production Prior to 1959	
	Short Tons	Short Tons	Year	Short Tons
Herring, Alaska . .	8,440	6,253	1937	18,816
Menhaden	219,000	158,074	1958	210,582
Sardines, Pacific . .	2,560	10,756	1936	121,739
Tuna & mackerel . .	21,000	25,311	1956	26,266
Other	44,000	47,746	-	-
Total	295,000	248,140	1956	295,793

¹ Partly estimated.

Fish Solubles and Homogenized-Condensed Fish, January-October 1958-59: Production of fish solubles and homogenized-condensed fish during the first 10 months of 1959 of 167,602 tons was up 45.8 percent from the 144,984 tons produced in the same period of 1958.

Table 3 - U. S. Production of Fish Solubles and Homogenized-Condensed Fish, January-October 1958-59			
January-October		Record Production Prior to 1959	
1959 ¹	1958	Year	Short Tons
167,602	114,984	1958	130,177

¹ Preliminary.

U. S. IMPORTS OF FISH MEAL, AND FISH SOLUBLES, JANUARY-OCTOBER 1958-59:

Fish Meal: United States imports of fish meal during the first 10 months of

1959 of 123,744 tons were up sharply from the 85,780 tons imported during January-October 1958. The leading

Table 4 - U. S. Imports of Fish Meal by Countries, January-October 1958-59				
Country	January-October 1959/1958		Record Imports Prior to 1959	
	Short Tons	Short Tons	Year	Short Tons
Canada	35,533	20,649	1956	57,127
Peru	46,622	31,955	1958	33,371
Chile	4,995	6,200	1958	8,160
Angola	20,738	16,691	1953	33,589
Union of So. Africa	7,852	5,142	1952	37,523
Norway	141	1,184	1952	50,181
Other countries . .	7,863	3,959	-	-
Total	123,744	85,780	1952	203,539
1/ Preliminary.				

supplier of fish meal to the United States during the first 10 months of both 1958 and 1959 was Peru, followed by Canada and Angola. Peru, Canada, and Angola supplied about 83.2 percent of the United States imports in the first 10 months of 1959 and about 80.9 percent during the same period of 1958.

Fish Solubles: United States imports of fish solubles January-October 1959 jumped 268.5 percent from the January-October 1958 imports. Denmark increased shipments of fish solubles to the United

Table 5 - U. S. Imports of Fish Solubles, January-October 1958-59				
Country	January-October 1959/1958		Record Imports Prior to 1959	
	Short Tons	Short Tons	Year	Short Tons
Canada	1,345	1,815	1957	4,024
Denmark	17,606	6,044	1958	9,943
West Germany . .	1,705	2/	2/	2/
Union of S. Africa	1,653	551	1958	1,063
Other Countries . .	812	110	2/	2/
Total	23,121	8,520	1958	14,567
1/ Preliminary. 2/ Data not available.				
Notes: Imports from the Union of South Africa are believed to be on a dry-weight basis. All others are understood to be on a wet basis.				

States during January-October 1959 as compared with the same period of 1958 by 243.3 percent.

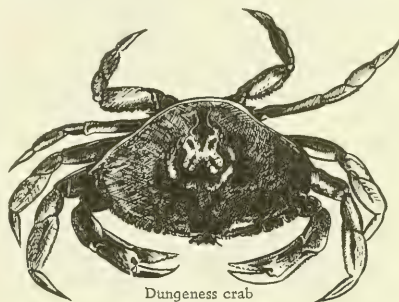


California

BIOLOGISTS PREDICT NORMAL STOCKS OF DUNGENESS CRAB:

The California Department of Fish and Game stated on December 18, 1959, that fewer Dungeness crabs were caught

off San Francisco in 1959 as compared with 1958, but the 1958 catch was above average. The crab catch in 1958 totaled about 5 million pounds, while the average catch for the central coast is 3½-4 million pounds.



Dungeness crab

California marine biologists report that the crab harvest fluctuates because of environmental conditions from year to year. It may even decline naturally over a succession of years, but this does not indicate the resource is being fished out.

On their research cruise before the 1959 season opening, Department of Fish and Game personnel found many crabs just under legal size. These will be of legal size in 1960, indicating that the resource is healthy.

The Department's research crew made a cruise off the Eureka area in November and reported that the season there, which opened December 15, 1959, should be good. There were good numbers of crab, but the research vessel did not find any unusually large "jumbo" crabs, as have been found in some previous years.

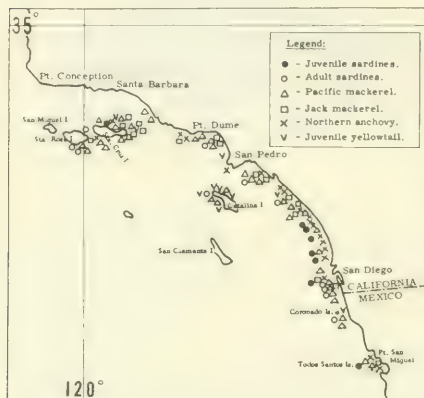
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PELAGIC FISH POPULATION SURVEY OFF COAST OF SOUTHERN AND CENTRAL CALIFORNIA CONTINUED:

M/V "Alaska" Cruise 59A8-Pelagic Fish: The coastal waters and islands of southern California from Santa Barbara to Todos Santos Bay, Baja Calif., was surveyed (September 21-October 10, 1959) by the California Department of Fish and Game research vessel Alaska

to sample young sardines for determining the relative abundance and distribution of fish resulting from the 1959 spawning.

Other objectives were to sample adult sardines, Pacific mackerel, jack mackerel, and anchovies to determine their relative numbers, their distributions, and their ages; and to collect live sardines for aquarium experiments conducted by the California Academy of Sciences.



M/V Alaska Cruise 59A-8-Pelagic (September 21 to October 10, 1959).

Pacific mackerel were taken at 38, sardines at 19, anchovies at 19, and jack mackerel at 16 of the 112 night light stations occupied.

Eight of the 19 sardine samples consisted of the 1959 year-class. These fish were smaller than normal for this time of year ranging from 43 to 115 mm. ($1\frac{3}{4}$ to $4\frac{1}{2}$ inches). Most were taken between San Diego and Carlsbad. They were lightly mixed with anchovies. Most of the adult sardine samples were collected in the vicinity of San Diego and the Channel Islands. Several light stations were occupied close to commercial vessels actively netting sardines, but no fish were attracted to the lights.

Pacific mackerel were present throughout most of the area and were taken on 34 percent of the stations. The percentage of successful stations for Pacific

mackerel was one of the highest recorded for surveys in this area. The dominant size group averaged about 260 mm. ($10\frac{3}{4}$ inches) fork length.

Large anchovies ranging from 120 to 162 mm. ($4\frac{3}{4}$ to $6\frac{3}{8}$ inches) in length were taken at San Diego and Santa Cruz Island. Fish of this size have been scarce in the southern California live-bait fishery for the past two years.

Bioluminescence ranged from fair to poor for visual scouting. In 444 miles of scouting, 20 schools were sighted--6 were identified as Pacific mackerel, 6 as anchovy, 4 as bonito, and 4 were unidentified.

A total of 32 juvenile yellowtail was collected at 11 stations off the Coronados, Santa Catalina and Santa Cruz Islands, and along the mainland off Dana Point and Rocky Point. These fish ranged in length from 84 to 160 mm. fork length ($3\frac{1}{4}$ to $6\frac{1}{4}$ inches) and probably represented successful spawning of yellowtail off southern California.

Several specimens of the sharpchin flyingfish, Fodiator acutus, were taken on 3 stations between Carlsbad and Dana Point. This species is rare this far north.

Approximately 50 live sardines were delivered to Marineland of the Pacific for aquarium experiments being conducted by California Academy of Sciences.

Sea surface temperatures ranged from 16.7° C. (62.1° F.) at Port Hueneme to 20.9° C. (69.6° F.) at Todos Santos Bay. The average temperature north of Point Dume was 19.2° C. (66.6° F.) and 19.7° C. (67.5° F.) south of the point.

Airplane Spotting Flight 59-17-Pelagic Fish: The inshore area from the Tijuana River to Port Ross was surveyed from the air (October 13-16, 1959) by the Department's Cessna 180 (3632C) to determine the distribution and abundance of pelagic fish schools.

Weather and visibility varied from excellent north of Santa Monica Bay to very poor south of that point. Because

of low clouds, smog and haze, only spot-ty observations were possible south of Point Dume. No fish schools were seen.

Conditions for aerial observations were very good between Point Dume and Point Arguello, but only 6 schools (all bonito) were observed. They were about one mile offshore between Gaviota and El Capitan. All were quite large, and moving slowly in a "mill" formation.

In San Luis Obispo Bay 55 poorly defined anchovy schools were scattered around the Avila piers in 2 to 4 fathoms of water. No other fish schools were seen south of Monterey Bay.

A total of 73 anchovy schools was counted in Monterey Bay. All were between the mouth of the Pajaro River and Santa Cruz Point inside the 10-fathom contour. Although not positively identified, 90 additional schools were seen in the Bay. These were mostly very large and deep and centered about 3 miles south of Needle Rock Point. An additional 15 very large unidentified schools were observed 2 miles northwest of Ano Nuevo Point.

Many small, fragmentary, anchovy spots were found between Ano Nuevo Point and Pescadero Creek. Also present in the area were: a large number of unidentified non-schooling fish, several large "pods" of sea lions, thousands of gulls, and 12 large basking sharks. The unidentified fish seemed to overlay the entire area and appeared to be about 12 inches in length, pale milky-gray in color and quite slow in their movements. The various groups of sea lions contained many hundreds of individuals, some of which seemed to be actively feeding while others were moving leisurely in the general direction of Ano Nuevo Point. The 12 large basking sharks were very close to shore off Pescadero Creek.

Only 11 anchovy schools were spotted north of Pescadero creek--10 over Four Fathom Bank just north of the Golden Gate, and one was one-half mile off Point Reyes Beach.

The water in the extreme inshore area from Pedro Point to Bodega Head was ex-

tremely dirty ranging from gray-green to a dark purple-brown.

* * * * *

AERIAL CENSUS OF COMMERCIAL AND SPORT FISHING CONTINUED:

Airplane Spotting Flight 59-18-Abalone: The Channel Islands were surveyed from the air on October 23, 1959, by the California Department of Fish and Game Beechcraft to observe locations and numbers of commercial abalone diving boats.

Four diving boats were observed in operation at Santa Rosa Island in the vicinity of Johnson's Lee where red abalone (Haliotis rufescens) predominate.

Three diving boats were observed at Seal Cove on San Clemente Island. In addition to these conventional diving boats a mothership and four skiffs were observed at this location. This is the first time a skiff-type of operation, which utilizes hookah-type diving gear instead of "hard hat" has been observed among the Channel Islands.

Kelp growth showed considerable increase along the west coasts of Santa Rosa, San Clemente, and Santa Cruz Islands since the last observation flight September 20, 1959.

Observations were confined to Santa Cruz, Santa Barbara, Santa Catalina, and San Clemente Islands. Clearance could not be obtained from the military to fly over Anacapa and San Miguel Islands and fog obscured San Nicolas Island. (See chart p. 30.)

Airplane Spotting Flight 59-19-Abalone: The shoreline from Ft. Bragg to San Francisco was surveyed from the air by the Department's Cessna 182 to estimate the numbers of abalone sport fishermen, clam diggers, and shoreside sport anglers.

Observations were not complete as 2 small sections of coast were blanketed by tongues of fog extending over the coast from a solid bank at sea. One was the 6-mile section of coast from just below Big River to just north of Albion. The

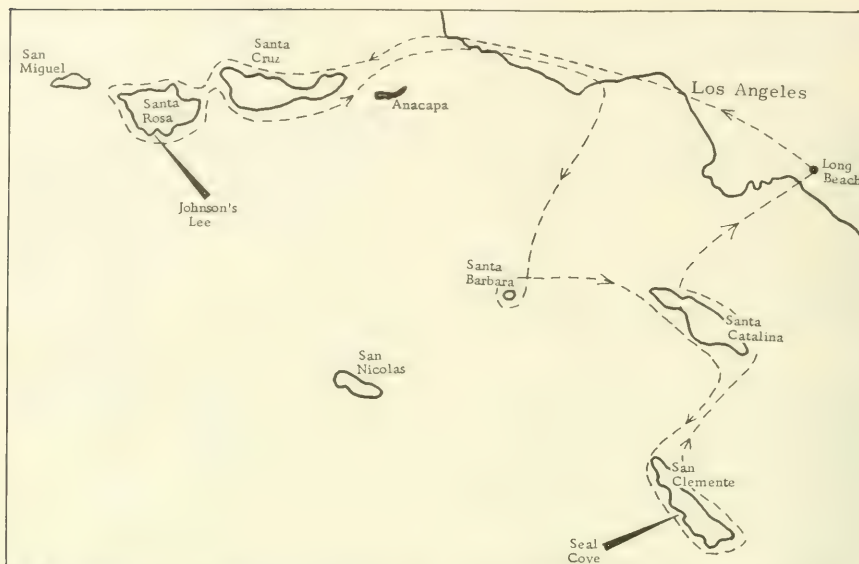


Fig. 1 - Airplane Spotting Flight 59-18 (October 23, 1959), to observe locations of commercial abalone diving activity.

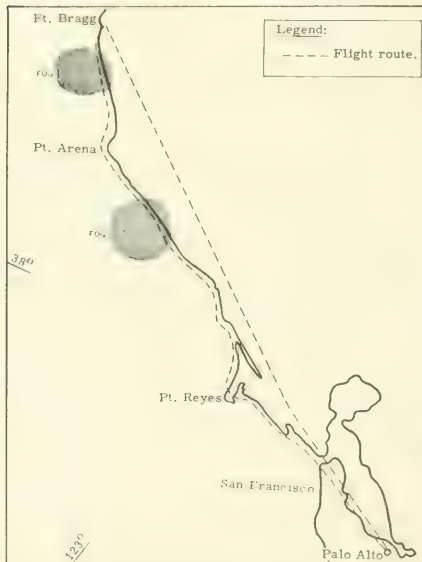


Fig. 2 - Airplane Spotting Flight 59-19 (November 1, 1959), to estimate numbers of abalone sport fishermen, clam diggers, and shoreside sport anglers.

other was the 10 miles of coast just north of Stewarts Pt. The Sunday afternoon flight was on a relatively warm day for the central California coast this time of year. There was a minus tide at sunset, the surf was definitely below average and the wind was light and variable; thus conditions were almost ideal for the sportsmen. This survey did not include Tomales Bay.



Cans--Shipments for Fishery Products, January-September 1959



Total shipments of metal cans for fishery products during January-September 1959 amounted to 93,049 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 94,284 tons in the same period of 1958. Fish

and shellfish canning activities in September 1959 were beginning to drop off seasonally from the high levels reached in July and August. Packs of salmon and Maine sardines were light in September and the pack of California sardines was way below predictions due to disputes over ex-vessel prices and scarcity of fish. Canned packs of tuna and shrimp in September of this year were good. Shipments of metal cans declined 0.3 percent from August to September 1959 and were down by 15.6 percent from September 1958 to September 1959.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.



Central Pacific Fisheries Investigations

RESEARCH ON IDENTIFICATION OF TUNA LARVAE:

Several studies concerned with various aspects of the life history of the tunas, such as investigations of maturation and fecundity of adults, identification, distribution, abundance, and ecology of the larvae and juveniles, are being made by the U. S. Bureau of Commercial Fisheries' Honolulu Biological Laboratory. Since the studies require methods for sampling larvae and juveniles that will yield both qualitative and quantitative results, various types of nets (including small plankton nets and mid-water trawls with a mouth-opening of 1,200 square feet) have been used. Exchange of larvae and juveniles with various research institutions in the Pacific have augmented the number of specimens available for study. In addition, the laboratory received, on a loan basis, the collection of young *Scombroidea* made from the Danish research vessel *Dana* during several cruises to the Atlantic and around the world between 1911 and 1938.

On the basis of morphological features, positive identification has been made of the following tuna and tuna-like larvae: skipjack (*Katsuwonus pelamis*), yellowfin (*Neothunnus macropterus*), black

skipjack (*Euthynnus yaito*, *E. alletteratus*), and the frigate mackerel (*Auxis thazard*). Yet to be identified are larvae of albacore (*Thunnus germon*), big-eyed (*Parathunnus sibi*), bluefin (*Thunnus thynnus*, *T. orientalis*, and *T. maccoyi*), and closely related forms such as the dogtooth tuna (*Germo nuda*).

In addition to studies of morphological features, other attempts at identification of larvae include the use of paper partition chromatography and serological techniques. It is possible to identify the adults of albacore, big-eyed, frigate mackerels (two species not distinguished), yellowfin, skipjack, and black skipjack through chromatography. However, this technique has technological limitations for use with larvae. Serological techniques, being conducted on Honolulu Biological Laboratory samples at the Seattle Biological Laboratory, await evaluation.

Better methods for capture of tuna larvae and juveniles are being developed. A high-speed sampler will be tested in the tropical waters of the Pacific during the spring of 1960. Nine out of 23 hauls with a midwater trawl yielded 39 juvenile tuna from those waters. Modifications of the trawl to increase its efficiency are being made. It will be used in an attempt to collect albacore tuna larvae next summer. A pumping system permitting continuous sampling from a vessel underway is also being considered. Installation of an aquarium system aboard the Bureau's research vessel *Charles H. Gilbert*, in which attempts will be made to fertilize tuna eggs and rear larvae and juveniles, is planned for the near future.

It is anticipated that studies utilizing specimens and samples presently available to Laboratory personnel, along with those from the future sampling programs, will result in: (1) identification of the important species of tuna and tuna-like larvae and juveniles; (2) increased knowledge concerning the life history of the tunas; and (3) a better understanding of the ecology, distribution, and abundance of the larvae and adults.



Crabs

CHESAPEAKE BAY BLUE CRABS SCARCE IN 1959/60 WINTER:

Beginning December 1, 1959, and for the following three months, over 150 Virginia vessels and motorboats, manned by more than 400 men, dredged for blue crabs in Chesapeake Bay. Dredgers were expected to be disappointed if they anticipated a large harvest for, according to marine biologists of the Virginia Fisheries Laboratory, blue crabs would probably be scarce and dredge-boat catches would be near the record low.

The forecast of a low catch was actually made in December 1958, following observations that the 1958 brood was



Blue Crab

very small. As additional evidence that the crop was small, the soft and peeler-crab catch at Tangier Island was about one-half normal size in the summer of 1959. Tangier Island usually produces about one-half of Virginia's soft crabs. Crabs reach commercial size a year after hatching, and are usually at least 18 months old when caught by the winter dredges. Since 1950, catches have been above average in 5 winters and below average in 4. After this winter the score will be even.

Crab dredgers have been disappointed with their catches the last three winters. Last year the hibernating crabs bedded down among millions of blue mussels which promptly attached themselves to the crabs, often 200 or more mussels per crab. Thousands of blue mussels were brought up by each dredge haul, and extra deck hands were hired to clean the crabs before they could be landed. Normally, the mussels set in the spring

grow to about one inch and then die during the heat of late summer. But in 1958, it is believed that the mussels survived because of the coolness of the summer. Most of the dredgers had never encountered as many mussels in previous years.

During a survey of the crab-dredging grounds in October 1959 from aboard the Laboratory's research vessel *Pathfinder*, the biologists found many dead mussels and only a few live ones, indicating that last year's problem will probably not be encountered this winter.

A bright ray of hope for the future for the blue crab industry was seen in October 1959 in a big crop of fingernail-size crabs, caught during one of the regular monthly surveys by Laboratory scientists. These crabs, hatched in mid-summer, will produce a better-than-average catch the winter of 1960/61.



Croakers

BIOLOGISTS SURVEY CHESAPEAKE BAY FOR 1959 YEAR-CLASS:

Fishery biologists from the Virginia Fisheries Laboratory aboard the research vessel *Pathfinder*, ranged over 1,000 miles of Chesapeake Bay and its tributaries during mid-November in search of the 1959 brood of croakers. They covered both Virginia and Maryland waters and were assisted by biologists from Maryland's Chesapeake Bay Laboratory. The purpose was to measure the success of the 1959 spawning of croakers which began in the fall of that year. "For the past two winters we have found young croakers in the rivers during the late fall but later on they were killed off, apparently by the unusually severe cold which persisted for several days keeping temperatures below freezing," the Virginia biologist in charge of the survey reported.

Croakers are known to spawn in the ocean outside of the Capes and the young come into Chesapeake Bay in fall and winter and move up into fresh water where they spend the first few months of their lives. When Virginia's scientists

surveyed the entire Bay in the spring of 1959 they located no young croakers anywhere. Although the Bay produced some fish of large size, 1959 croaker fishing was very poor, as had been predicted by the Laboratory's biologists. For instance, sport fishermen had to spend eight hours fishing during the summer of 1959 to catch as many croakers as they had landed in one hour in previous seasons and the commercial catch was generally low.

"The future of the croaker fishery depends on successful spawning in the ocean and survival of young fish that migrate into the Bay," the biologist emphasized. Although croakers leaving the Bay in fall are full of eggs, it is known that they do not deposit them until they reach ocean waters. In December 1959 explorations were started in the Atlantic in an attempt to locate areas where eggs are laid and where larval croakers may be found. One of the objectives of these research programs is to explain why the numbers of croakers available to fishermen varies so widely over the years. Work already completed indicates that all croakers caught by commercial and sport fishermen together has little effect on depleting numbers present in the Bay. Apparently the change in numbers is chiefly influenced by natural causes, but more work is necessary before we can know what factors affect croaker populations the most.



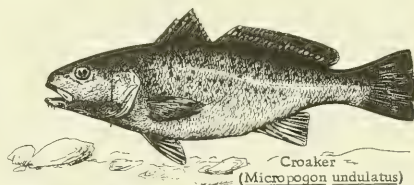
Virginia Fisheries Laboratory's research vessel Pathfinder.

On the 1959/60 surveys, biologists from Virginia's marine laboratory will carry on a cooperative study of menha-

den spawning with the U. S. Bureau of Commercial Fisheries, and will also release numerous drift bottles for studying ocean currents in conjunction with the Woods Hole Institution of Oceanography. Although this last phase of the program is intended primarily for oceanographers, the information obtained about ocean currents will also be helpful in clarifying puzzling questions about the movements of very young fishes. Drift bottle current studies will also yield more detailed knowledge about the movements of inshore currents which is necessary in dealing with the problems of the disposal of radioactive wastes and other pollutants in the sea.

VIRGINIA BIOLOGISTS SEEK BREEDING AREAS IN ATLANTIC:

A search for croaker breeding grounds was made December 7-10, 1959, by the research vessel Pathfinder of the Virginia Fisheries Laboratory. Areas in



the lower part of Chesapeake Bay and the Atlantic Ocean were surveyed. A total of 30 stations was occupied in areas extending 60 miles along the Atlantic coast south of Cape Henry, Va., and 50 miles out to sea. The ship hove-to at designated stations every 10 miles to take water samples, record water temperatures, and to release drift bottles for ocean current studies. Plankton tows were made with large plankton nets and a specially-designed deep-water sampler.

"Most of the work was done at night," the chief biologist reported, "because the chances of larval fish being near the surface are greater at that time." Bottom plankton samples were collected with a Gulf III plankton-sampler (developed by the Galveston Biological Laboratory of the U. S. Bureau of Commercial

Fisheries), a medium-speed sampler used for towing near the bottom.

This is the first exploration made specifically to locate areas where the croaker spawns and larval croakers develop. The biologists anticipate making trips every month during 1960 to establish the time and place of spawning not only for croaker, but also for menhaden, spot, grey sea trout, and other fish.



Federal Purchases of Fishery Products

DEPARTMENT OF
DEFENSE PURCHASES,
JANUARY-NOVEMBER 1959:

Fresh and Frozen Fishery Products:
For the use of the Armed Forces under the Department of Defense, 1.4 million pounds (value \$0.7 million) of fresh and

QUANTITY				VALUE			
November		Jan.-Nov.		November		Jan.-Nov.	
1959	1958	1959	1958	1959	1958	1959	1958
... (1,000 Lbs.) (\$1,000) ...			
1,443	1,499	20,876	20,881	713	908	10,748	11,967

frozen fishery products were purchased in November 1959 by the Military Subsistence Supply Agency. This was lower than the quantity purchased in October by 25.8 percent and 3.7 percent under the amount purchased in November 1958. The value of the purchases in November 1959 was lower by 32.9 percent as compared with October and 21.5 percent less than for November 1958.

During the first eleven months of 1959 purchases totaled 20.9 million pounds (valued at \$10.7 million)--about the same in quantity, but lower by 10.2 percent in value as compared with the similar period in 1958.

Prices paid for fresh and frozen fishery products by the Department of Defense in November 1959 averaged 49.4 cents a pound, about 5.2 cents less than the 54.6 cents paid in October and 11.2 cents less than the 60.6 cents paid during November 1958.

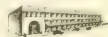
Canned Fishery Products: Salmon was the principal canned fishery product purchased for the use of the Armed Forces during November 1959. In the first eleven months of 1959, the purchases of canned tuna were down 40.5 percent, canned salmon lower by 67.5 percent, and canned sardines were up about eight-

Product	QUANTITY				VALUE			
	November		Jan.-Nov.		November		Jan.-Nov.	
	1959	1958	1959	1958	1959	1958	1959	1958
Tuna	355	1,035	2,957	4,966	154	542	1,357	1/
Salmon	414	553	1,055	3,336	267	341	737	1/
Sardine	1	18	1,026	111	1	6	166	1/

1/ Unavailable.

fold as compared with the same period in 1958.

Note: Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated because local purchases are not obtainable.



Great Lakes Fisheries Exploration and Gear Research

WESTERN LAKE ERIE SURVEYED FOR COMMERCIAL FISH STOCKS:

M/V "Active" Cruises 7 and 8: Exploratory fishing for commercial fish stocks in west central and western Lake Erie (between Fairport and Port Clinton, Ohio), was continued by the U. S. Bureau of Commercial Fisheries chartered fishing vessel Active between October 20 and November 23, 1959. Cruises 7 and 8 were planned to obtain additional information on the availability of smelt and other fish stocks to commercial fishermen.

Fishing operations during both cruises were hampered by high winds, rough seas, and hazardous ice formations. Fish concentrations were found to be widely scattered over the entire area and no commercial scale catches were taken.

A total of 31 trawl tows were completed in the 2-12 fathom depth range with a 50-foot, 2-seam balloon trawl net with 1½-inch and 2½-inch mesh cod ends. Individual trawl catches, which did not exceed 100 pounds per tow, were composed of mostly yellow perch and emerald shiners with smaller amounts of smelt, white bass, gizzard shad, alewife, whitefish, carp, and catfish. One seine set was made in Fairport Harbor on sizable echo-sounder indications with a 300-foot by 10-foot beach seine. All but a few pounds of emerald shiners escaped through the seine's one-inch mesh.

Surface water temperatures recorded during the cruises ranged from 59° F. in late October to 36° F.

at the termination of cruise 8. Bottom temperatures recorded were found to vary little from the surface temperatures indicating that thermal stratification of the lake waters had disappeared prior to cruise 7.

Cruise 7 was interrupted on October 25 at Vermilion, Ohio, for the purpose of demonstration of trawl gear to observers representing the Ohio Commercial Fishermen's Association and Ohio Sportsmen's and Conservation organizations.

Cruise 8 was the last exploratory fishing and gear research cruise scheduled for calendar year 1959. The M/V Active returned to Port Clinton, Ohio, November 23 for winter storage.



Great Lakes Fishery Investigations

WESTERN LAKE SUPERIOR FISHERY SURVEY CONTINUED:

M/V "Siscowet" Cruise 9: Abundance and distribution of spawning whitefish and the physical characteristics of whitefish spawning grounds were studied by U. S. Bureau of Commercial Fisheries personnel aboard the research vessel Siscowet during November 9-21, 1959. Gangs of approximately 3,000 feet of large-mesh nets (5- to 6-inch mesh, stretched measure) and 300 feet of small-mesh nets ($1\frac{1}{2}$ - and $2\frac{1}{2}$ -inch mesh) were set over spawning grounds. Through the guidance of commercial fishermen in the area, the following grounds were selected: Outer Island Shoals (west side), Cat Island Shoal, Big Bay on Madeline Island, Presque Isle Bay on Stockton Island, and Rocky Island Shoal. The bottoms of the various grounds were: Outer Island Shoals, small boulders and sand; Cat Island Shoal, broken bed-rock; Big Bay, smooth bed-rock; Presque Isle Bay, small boulders and sand; Rocky Island Shoal, large boulders.

The catch of spawning whitefish was meager at all locations. The largest catch was 19 whitefish (16 males, 3 females) on Rocky Island Shoal in water $3\frac{1}{2}$ to 9 fathoms deep. Two large-mesh nets floated about 1 foot below the surface in water $3\frac{1}{2}$ fathoms deep took no fish. Whitefish taken at other locations were as follows: Outer Island Shoals ($3\frac{1}{2}$ -7 fathoms), 2; Cat Island Shoal ($3\frac{1}{2}$ -8 fathoms), 5; Presque Isle Bay (5-13 fathoms), no catch; Big Bay (4-7 fathoms), 5. All of the whitefish were ripe males except 1 ripe female taken at Big Bay. Twenty-one of the fish were tagged and released at the point of capture.

The whitefish taken on the spawning grounds were relatively small. They varied from 17.3 to 23.7 inches long and averaged 19.8 inches.

Lake herring and menominee whitefish dominated the catch in the small-mesh nets at each location. Lesser catches were made of longnose suckers and burbot. The average weight of the 195 lake herring taken in the $2\frac{1}{2}$ -inch mesh nets was 0.7 pound. All of the mature lake herring and menominee whitefish were ripe and appeared to be in spawning condition.

A short gang of chub nets ($2\frac{1}{2}$ -inch mesh) was set in 45 fathoms between Madeline and Stockton Islands to investigate the spawning of chubs (*Leucichthys* sp.). Only 14 chubs were captured (12 *L. hoyi*, 2 *L. zenithicus*). One *L. hoyi* was spent and 11 were nearly ripe. The *L. zenithicus* were not ripe. Almost all of 78 lake herring in this lift were nearly ripe.

Bathythermograph casts showed water to be homothermous down to 45 fathoms. Surface temperatures varied from 37.4° F. at Big Bay to 41.8° F. at Outer Island Shoals.

Cruise 10: This cruise (November 23-December 26, 1959) explored the distribution of the lake herring during the spawning season and collected eggs from certain species of chubs (*Leucichthys* sp.). Gill nets were fished south of Stockton Island, and trawl tows were made south of Stockton Island and in Pike's Bay. A recording echo-sounder was operated over large areas among the Apostle Islands to learn more of the areal and vertical distribution of the lake herring at different periods of the day and night.

Concentrations of fish were recorded by the sounder in nearly all areas visited among the islands. The heaviest concentrations appeared at about 15 fathoms in water 25 to 50 fathoms deep. Vertical distribution was practically the same day and night. During the night some of the fish seemed to move along the 15-fathom level from deeper waters to inshore areas where they appeared just above bottom. It was assumed that fish that made traces on the sounder chart were lake herring as commercial nets were taking up to 3 tons per lift. Trawl tows by the Siscowet failed, however, to take lake herring in these areas.

Four night-time trawl tows were made south of Stockton Island at depths ranging from 7 to 45 fathoms. The sounder recorded fish concentrated on or near the bottom only at depths of 15 fathoms or less in this area. Tows made at 7 to 21 fathoms caught predominately smelt, trout-perch, and slimy muddlers. Twenty-eight whitefish (6 to 19 inches) and 7 lake trout (6 to 15 inches) were taken in three 12-minute tows. No lake herring were captured.

A 12-minute trawl tow made at 45 fathoms took 82 *L. hoyi* and lesser numbers of slimy muddlers, spoonhead muddlers, and ninespine sticklebacks. One lake herring was captured in this tow. The sounder recorded no concentration of fish on or near the bottom at this depth.

Two night-time trawls tows made in Pike's Bay at depths of 18 to 20 fathoms. The sounder recorded heavy concentrations of fish just off the bottom but they could not be positively identified as lake herring. The catch from two 12-minute tows consisted mainly of smelt and slimy muddlers. Four lake herring, 2 lake trout, 1 whitefish, and 1 *L. hoyi* were also taken.

Gangs of gill nets ($2\frac{1}{2}$ - and $2\frac{1}{2}$ -inch mesh) were set south of Stockton Island at 51 to 53 fathoms to capture spawning chubs (*Leucichthys* sp.). A set made on November 23 captured 161 *L. hoyi*, 4 *L. kiwi*, 20 *L. zenithicus*, 611 lake herring, and 48 burbot. Eggs were collected and fertilized from all ripe *L. hoyi* and *L. kiwi*. About 75 percent of the *L.*

hoi were green, 15 percent ripe, and 10 percent spent. Fifty percent of the *L. kiyi* were ripe and 50 percent green. All of the *L. zenithicus* were green and all of the lake herring were ripe. A set over the same grounds on December 2 captured 243 *L. hoi*, 4 *L. zenithicus*, 272 lake herring, and 8 burbot. At least 95 percent of the *L. hoi* were green and only 6 individuals were spent. All of the *L. zenithicus* were green and all lake herring were ripe or spent.

Chub eggs were taken to the Wisconsin Conservation Department fish hatchery at Bayfield where they will be held to the eyed stage. At that time they will be transferred to the hatchery at Northville, Mich., for hatching and study.

Bathymograph casts showed homothermous conditions down to 53 fathoms. Surface temperatures ranged from 35.5° F. at Pike's Bay to 37.8° F. south of Stockton Island.

Note: Also see Commercial Fisheries Review, January 1960 p. 38.



Gulf Fishery Investigations

Following are some of the highlights of the studies conducted by the Galveston, Tex., Biological Laboratory of the U. S. Bureau of Commercial Fisheries during October-December 1959.

MIGRATIONS OF SHRIMP: As of the fourth quarter of 1959, 27 of 7,084 pink shrimp stained and released in Barnes Sound, Fla., in early July 1959, were recovered. All were recaptured in Barnes Sound, excepting one caught at the entrance to Little Card Sound, immediately north of Barnes Sound. Results of this experiment suggest that the range of some pink shrimp populations is quite restricted.

Preliminary analysis of growth rates of Barnes Sound recoveries (predominately females) indicates an increase in mean carapace length of approximately 3.0 mm. a month. Mean carapace length at release was 19.5 mm. This represents a weight increase of from 115 to 87 count, heads off, during the first month after release.

During November 2-6, a total of 16,638 pink shrimp were stained with fast green and released in the Shark River area of Everglades National Park. The purpose of this experiment was to determine if pink shrimp nurtured in that locality contribute to the Tortugas fishery, to the Sanibel fishery, or perhaps to both. As of the end of 1959, four marked specimens were recovered by commercial shrimp vessels on the Tortugas grounds, the first of these was taken 35 days after being released. None were reported taken on the Sanibel grounds.

As the fourth quarter of 1959 closed, staining equipment was being transported to Bahia Honda Key for a shrimp marking operation to be conducted in Hawk Channel in the Atlantic southwest of Marathon. The purpose is to determine whether or not pink shrimp migrate from the Atlantic Ocean to the Tortugas grounds.

STAINED SHRIMP 50¢ REWARD

Shrimp have been marked with blue, green and red biological stains—in order to obtain information on migrations and growth. The color appears only on both sides of the head (in the gills) as shown in the illustration.

Look for color here



A reward of 50¢ will be paid for stained shrimp when returned with the following information:

1. Exact place the shrimp was caught.
2. Date the shrimp was caught.

NOTIFY BY MAIL THE U.S. FISH AND WILDLIFE SERVICE, BIOLOGICAL LABORATORY, P.O. BOX 3098, GALVESTON, TEXAS, OR CONTACT ANY FISH AND WILDLIFE SERVICE AGENT OR REPRESENTATIVE.

Stained shrimp must be verified by Fish and Wildlife Service Biologist before payment. The stains used are approved for this use by the Food and Drug Administration.

Typical poster distributed in shrimp ports in Gulf States to encourage the return of stained shrimp by fishermen, dealers, and processors.

Several collections of gravid female shrimp were made in support of the project concerned with identification of larvae. Ripe females brought to the laboratory were placed in containers and observed in hopes they would spawn viable eggs. On October 7, a single female seabob (*Xiphopenaeus krøyeri*) was caught in a trawl haul at one of the Gulf sampling stations and returned to the laboratory where she spawned. Overnight trips to offshore spawning grounds (15-25 fathoms) southeast of Galveston were made on October 22, and November 19. Over 100 ripe brown shrimp (*Penaeus aztecus*) were collected each trip and brought back to the laboratory where several spawned. Plankton samples taken on the spawning grounds were found to contain penaeid nauplii and later stages. These should aid in assembling a complete series of larval instars.

SHRIMP LARVAL STUDIES: In addition to maintaining a small number of miscellaneous shrimp species (*Eusicyonia* sp., *Xiphopenaeus krøyeri*, *Trachypenaeus* sp., and *Hippolytidae*, species unknown), three of commercial importance, *Penaeus aztecus*, *P. duorarum*, and *P. setiferus*, have been maintained in substantial numbers in the laboratory under conditions of varying diet, tempera-

ture, and lighting for a period of more than six months. Although molts have occurred at regular intervals and examination of casts of recently molted shrimp have revealed that copulation did occur on several occasions among individuals held in the aquaria, we have had no success inducing these shrimp to attain a spawning condition. In fact, it has been noted that shrimp brought into the laboratory with partially mature gonads actually have them regress after remaining in the laboratory for as long as a month. Only those shrimp possessing mature gonads at the time of capture have spawned in the laboratory, usually very shortly after arrival. It was from such individuals that early larval stages of two species of shrimp were obtained.

Because of the lack of success in obtaining spawn from shrimp maintained under artificial conditions for long periods of time, the number being kept in the laboratory has been reduced somewhat. Efforts are now being directed toward securing females most likely to spawn immediately after being deposited in laboratory tanks.

On October 7, one ripe female seabob, *Xiphopenaeus kroyeri*, was taken during a regular offshore plankton collecting trip. Held in a fifteen-gallon plastic aquarium, it spawned the following day. The eggs, only slightly heavier than sea water, were carefully siphoned from the bottom of the aquarium and transferred to two four-liter beakers for closer observation. Continuous observations were recorded as the eggs hatched and the larvae developed through five naupliar instars into the first protozoa.

On October 24, the day following their capture, several gravid brown shrimp, *P. aztecus*, spawned in the laboratory. Two days later one female taken during the same collecting trip was observed while in the act of spawning. Unfortunately, high microorganism densities proved detrimental to the developing eggs and larvae; consequently, only a few individuals reached the first protozoal stage. As in the October *Xiphopenaeus* spawn, a continuing record was kept and specimens of each larval stage were preserved.

Gravid brown shrimp were again brought into the laboratory on November 20. Spawning began the following day and continued over the next three days, resulting in a large number of eggs being obtained. Several instances of abortion were noted during this period. By carefully planning and making adequate preparation beforehand, much of the contamination experienced during previous spawns was avoided. As a consequence, a large number of eggs hatched and hence a larger number of nauplii were carried through to the first protozoal stage. Specimens of each developmental stage were again preserved and all observations and other pertinent data recorded to provide for later description of the species during the stages observed.

Preliminary work toward a detailed description of successive developmental stages in the life history of *P. aztecus* has begun. Accurate drawings and tracings are being made with the aid of camera lucida, stained mounts, and photo-micrographs which were taken of both living and preserved organisms. Staining, clearing, and mounting techniques have been satisfactorily worked out and a

number of specimens have been permanently mounted for ease and convenience of study, and for future reference. Comparative study of early stages of species made available thus far will begin shortly.

BAIT SHRIMP PRODUCTION, GALVESTON

BAY: The statistical canvass of bait-shrimp dealers and suppliers in the Galveston Bay area continued on a routine basis. Estimates of total production (volume consumed) and gear effort expenditure indicate vigorous growth of the local bait-shrimp industry. Whereas, approximately 676,000 pounds were handled during the two-year period ending May 30, 1959, about 419,000 pounds were landed and sold commercially during July through November 1959. Brown and white shrimp were by far the dominant species taken, the latter being the more important on a year-round basis.

INDUSTRIAL FISHERY STUDIES: Age determinations of menhaden by scale analyses were completed for the 1958 menhaden samples collected at Moss Point, Miss. One-year-old fish comprise 54.8 percent of the specimens, compared to 23.3 percent for this age group in 1957. Two-year olds declined from 66.8 percent in 1957 to 20.5 percent possibly reflecting the small percentage of one-year olds in 1957. The percentage of three-year olds increased from 9.0 percent in 1957 to 19.4 percent which might be expected from the very high percentage of two-year-old fish in 1957. Young of the year (zero's) increased from 0.3 percent to 2.8 percent. Most of these fish were taken in late summer. The remaining 2.4 percent were made up of 4- and 5-year olds.

During October 1959, croaker (*Micropogon undulatus*) contributed approximately 40 percent by weight to the industrial fish catches sampled, spot (*Leiostomus xanthurus*) 10 percent, and white trout (*Cynoscion nothus*) 14 percent. These three species made up roughly 64 percent of the catches sampled during that month. The remaining 36 percent was made up of numerous other species in varying amounts.

During November croaker roughly contributed 60 percent of the weight of the catches sampled; spot, 6 percent; and white trout, 7 percent. Combined, these three species made up 72 percent of the total weight of the catches sampled. The species list now includes 63 families and 141 species.

The industrial fish catches sampled during October and November were taken in waters between Gulf Shores, Ala., to the east and Timbalier Bay, La., on the west. Ninety-seven percent of all catches sampled were made between Gulf Shores and the mouth of the Mississippi River, and 67 percent of the catch was made between the mouth of Mobile Bay and a line running from Horn Island down the eastern shore of Chandeleur Island to the mouth of the Mississippi River. Most fish were caught in waters of 3 to 7 fathoms during October and November with the peak at 4 fathoms.

Studies of the life histories of several important species contributing to this fishery have been limited to a weekly catch sample for length, weight, and spawning condition studies. Personnel assigned to this project have been occupied with sampling for species composition, gathering catch statistics, and working up the data to a form usable for publication.

The study of the demersal fish utilized for industrial products such as pet food, mink food, and fish meal for animal foods is being carried on in much the same manner as described in previous reports this year, except that starting December 1, 1959, sampling intensity was reduced.

Sampling as of that date was reduced to two days a week to prepare past data for publication and to allow more time for other phases of the study. As many vessels as possible are sampled during the two days each week. In order to minimize any bias due to the days of the week sampled, it is tentatively planned to advance the sampling time to two calendar days each week. For instance, it will be done on Monday and Tuesday this week, Wednesday and Thursday next week, and Thursday and Friday the third week. The cycle will start over again the fourth week. In case no vessels land on the days scheduled, the following day's landings will be sampled.

During October 68 vessels were sampled. Their total catch was 1,874,213 pounds. The average weight per catch was 27,562 pounds. During November, 53 landings were sampled. They had a combined weight of 960,101 pounds. The average catch was 18,115 pounds. This made a total for the two months of 121 vessels sampled, a total of 2,834,314 pounds of fish, and an average catch of 23,424 pounds per vessel.

Note: See *Commercial Fisheries Review*, March 1959 p. 38.



Maine Sardines

CANNING SEASON FOR 1959 CLOSURES WITH A SHORT PACK:

The Maine sardine packing season officially closed at midnight December 1, 1959, with a total canned pack of approximately 1,750,000 cases (100 3 $\frac{1}{2}$ -oz. cans), which was far short of the industry's preseason goal of 2,100,000 cases.

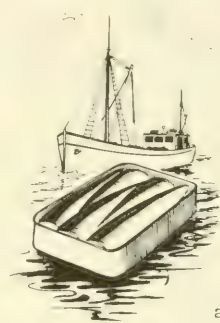
The subnormal pack will result in a complete sellout of stocks by all canners before the 1960 season gets under way next June with shortages of many types and varieties occurring by midwinter, the Maine Sardine Council predicts.

The comparatively small carryover from the 1958 pack would not make up the deficit in the disappointing pack in 1959.

The short pack was due to an uncertain, spotty, and thoroughly unsatisfactory fish supply. The small-size herring were late in arriving on the coast and there was limited production in June, which is normally one of the best months of the year.

From then on, it was a case of continuous uncertainty which was topped off by failure of the usual fall run of highly desirable

canning fish to materialize. Many plants closed in mid-October and those that kept open through November enjoyed only sporadic operations.



The "western" and "eastern" areas produced a major percentage of the fish while the traditionally steady supply in the middle area from Milbridge to Rockland failed for the first time in years. The situation was not an abnormal one for the 1950's as shortages also occurred in 1951 and 1955. Scientists blame poor spawning and survival conditions rather than any major or permanent dislocation of the fish supply.

The market for Maine sardines is normal with prices firm, and is expected to continue so for an indefinite period.

A total of 35 plants operated for varying lengths of time during the season with but few of them getting the sizable pack necessary for efficient operations. Generally speaking it was also a poor year for the sardine fishermen.

CANNED STOCKS, NOVEMBER 1, 1959:

Distributors' stocks of Maine sardines totaled 296,000 actual cases on November 1, 1959--16,000 cases or 5.1 percent less than the 312,000 cases on hand November 1, 1958. Stocks held by distributors on July 1, 1959, amounted to 176,000 cases, and on April 1, 1959, totaled 254,000 cases, according to estimates made by the U. S. Bureau of the Census.

Canners' stocks on November 1, 1959, totaled 1,001,000 standard cases (100 3 $\frac{1}{2}$ -oz. cans), a decrease of 36,000 cases (3.5 percent) as compared with November 1, 1958.

Table 1 - Canned Maine Sardines--Wholesale Distributor's and Cannery's Stocks, November 1959 with Comparisons^{1/}

Type	Unit	1959/60	1958/59				
		11/1/59	11/1/58	1/1/59	4/1/59	6/1/59	7/1/59
Distributors	1,000 Actual Cases	296	312	268	254	197	176
Cannerys	1,000 Standard Cases ^{2/}	1,001	1,037	891	474	272	422

^{1/}Based on marketing season from November 1-October 31.^{2/}100 3/4-oz. cans equal one standard case.

The 1959 pack (from the season which opened on April 15, 1959, and ended on December 1, 1959) amounted to about 1,750,000 standard cases as compared with 2,100,000 cases packed in the 1958 season. The pack for the 1957 season totaled 2,117,151 standard cases.

The total supply (pack plus carry-over on April 15, 1959) at the cannery's level as of November 1, 1959, amounted to 2,121,000 standard cases or 6.3 percent under the total supply of 2,263,000 cases as of November 1, 1958. Cannery's shipments from April 15, 1959, to November 1, 1959, amounted to 1,120,000 cases as compared with 1,226,000 cases during the April 15-November 1, 1958, period.



Maryland

CONTROLLABLE PITCH PROPELLER ON HYDRAULIC DREDGE VESSELS MAY REDUCE SOFT-CLAM HARVESTING COSTS:

A Maryland State shellfish biologist cooperating with a private shipyard on December 18, 1959, disclosed an equipment improvement which promises to reduce soft-clam harvesting costs by 20 percent.

The shellfish biologist of Maryland's Chesapeake Biological Laboratory has tested satisfactorily a controllable-pitch propeller which cuts power needs of a typical clam rig in half. He proposed the development of this new powering system to a number of propeller manufacturers and a Connecticut shipyard engineered the final product, which is now being field-tested. If further tests confirm the excellent results from preliminary tests, the propeller will be on the market in the spring of 1960.

The new propeller eliminates one of the two large power plants presently required on most of Maryland's soft-clam vessels. One of the engines propels the vessel while the other drives a powerful water pump which literally blows clams out of the bottom mud in the Chesapeake Bay.

The pump engine must work at high speed to develop the necessary water pressure, but the boat itself should move very slowly. The biologist combined the two requirements by using one engine to serve both purposes; the "flattened" blades of the propeller bite only small slices of water on each turn, even with the engine running fast enough to drive the water pump. When clam harvesting operations are finished, the clammer disengages the water pump, adjusts the propeller bite to a sharp angle, and heads home at a normal cruising speed.

Besides eliminating an engine (usually 80-120 hp.) and its initial high cost, the propeller will cut gasoline consumption by about 20 percent, the biologist believes. The deadweight of the boat will also be reduced, storage space will be gained, and engine maintenance costs should be lower.

The design was made purposely simple enough to withstand long-term high-load clam harvesting operations, the biologist said. It has been tested aboard the Laboratory's research vessel John A. Ryder.

In 1959, the number of licensed clam boats in Maryland was 224. The year's harvest will be about 300,000 bushels, worth \$1.2 million, or more than the rest of the Nation's combined output of soft clams.

The Director of the laboratory states that while their research doesn't ordinarily extend to design and development of commercial harvesting gear, their extensive studies of clams and the new clam dredge have made them unusually aware of the young industry's problems.

* * * * *

LITTLE FALLS FISHWAY NEARS COMPLETION:

After many years of effort by the U. S. Fish and Wildlife Service and the Maryland fishery agencies, the proposed fishway at the new Corps of Engineers dam at Little Falls on the Potomac River near Brookmont, Md., is rapidly becoming a reality. It was over 80 percent complete in October 1959, and is expected to be ready for operation in the spring of 1960.



North Atlantic Fisheries Exploration and Gear Research

SURVEY OF DEEP-WATER WHITING ABUNDANCE IN WINTER OFF NEW ENGLAND:

M/V Delaware Cruise 60-1: To determine the abundance of whiting (*Merluccius* sp.) in deep water during the winter months was the purpose of a January 5-31, 1960, scheduled cruise to the Georges Bank area and the continental shelf south of Block Island of the U. S. Bureau of Commercial Fisheries' exploratory fishing vessel Delaware.

Fishing tests along the Continental Shelf south of Block Island were to be made with both bottom and midwater trawls.

Oceanography

WOODS HOLE OCEANOGRAPHIC INSTITUTION RECEIVES GRANT FOR RESEARCH VESSEL:

A \$3 million grant from the National Science Foundation for the design and construction of a new oceanographic research vessel was announced November 25, 1959, by the Woods Hole Oceanographic Institution, a private nonprofit research organization. This is the largest gift or grant the Institution has received in its 29 years of existence.

In 1930, the Rockefeller Foundation and the Carnegie Corporation provided about \$2 million to the Institution to erect its first laboratory, to design and build a research vessel, and to employ a small professional staff. Since that time other grants have made it possible for the Institution to increase its scientific staff to about 135 investigators and a total staff of nearly 400. The Institution's fleet consists of 5 seagoing vessels and three aircraft, while its shore facilities include two large laboratories.

The Board of Trustees recently adopted a major development program for the Institution, which hopes to raise \$38 million for the Endowment Fund, to

increase its staff, provide more fellowships, endow four Chairs in oceanography, build a third laboratory, and renovate its fleet.

The Institution designed and built the research vessel Atlantis in 1931. Today that famous vessel still is the only United States deep-sea vessel especially designed for oceanographic work. The vessel has sailed some 1.5 million miles in all oceans and is out to sea some 250 days each year. Apart from the fact that the ship is old and may soon have to be laid up, the Atlantis has grown too small. One of the difficulties in oceanography has been that students do not have the opportunity to go to sea. The new vessel will have accommodations for 19 scientists as opposed to 9 on board the Atlantis and most of the Institution's other ships. It is expected that a number of students will be taken aboard the new vessel.

In addition to the Atlantis, the Institution has had the use of other ships--yachts, fishing boats, naval vessels, etc. Most of these vessels were acquired to fill an immediate need and were adapted to do the job as well as possible. Such conversions are costly to accomplish and to operate and less efficient than specially designed ships.

The selection of the new vessel has resulted from a close examination of the needs of modern oceanography. A committee has worked hard to develop a ship, 175 feet long, that would incorporate the unique qualities and features necessary for the Institution's work.

For instance, it is planned to control the rolling of the ship with tanks whose liquid contents are synchronized to the rolling period of the ship. A center well in the hull will make it possible to lower instruments from below decks, while a bow propulsion unit will enable precise maneuvering of the ship. An underwater observation chamber will be placed in the bulbous bow and the ship will be able to creep along at very slow speeds when desired. She will have a range of 7,000 miles at 12 knots. Also, the ship is to be as quiet as possible in machinery and propulsion so as to have as little ship

noise as possible while making underwater sound studies. About ten winches are planned--some will be used to lower equipment for shallow depths while others will be capable of reaching to the ocean bottom. The new ship will have high standards of living quarters.

The new vessel will be the best equipped research ship afloat and is expected to be the most modern in design. Her superior facilities will enable her to carry out the increasingly complex phases of modern oceanographic field work.



Oregon

USE OF MONOFILAMENT IN SALMON GILL NETS PROHIBITED:

On December 8, 1959, the Oregon Fish Commission voted to prohibit the use of monofilament gill-net mesh in Oregon. This action will tie in with the state of Washington's present ban on monofilament nets.

Monofilament, in use for sportfishing lines for several years, has only recently been woven into gill nets. It is more effective than conventional linen or nylon nets because it is practically invisible in water and permits effective use in daylight hours.

Oregon and Washington fishery biologists stated that use of the nets possibly could increase catches and necessitate other restrictions on the already severely restricted Columbia River gill-net fishery for salmon.



Oysters

OBSERVATIONS ON CONDITION OF MARYLAND'S GROUNDS:

A three-agency biological check of Chesapeake Bay's public oyster bars yielded some good news and some bad, Maryland's Chesapeake Biological Laboratory reported on December 18, 1959.

The Laboratory, the Maryland Tidewater Fisheries Commission, and the U. S. Bureau of Commercial Fisheries cooperated in checking representative productive oyster bars from upper Chesapeake Bay to the Virginia line. The senior shellfish biologist of the Laboratory reported the following:

Favorable Observations: The Bay's oysters are healthy. Those above the Chesapeake Bay Bridge are especially fat and have grown rapidly because rains during the summer of 1959 held off and allowed the upper Bay to become saltier than usual. Upper Bay oysters thrive and fatten in such conditions. In addition, no sign was seen of the heavy oyster mortalities such as have recently plagued nearby states. Scientists noted the best set of baby oysters in Tangier Sound since 1945.

Unfavorable Observations: The set of oyster spat above the Chesapeake Bay Bridge was again very poor. The shellfish biologist states "The last good set there was in 1955 and that is what they are working on now. The Western Shore north of Cove Point showed near zero set for its sixteenth consecutive year."

"The adult oyster population, therefore, is decreasing steadily in these regions, as it is in many other Maryland areas."

The survey was made aboard the Commission's survey vessel, Maryland. Samples were taken by dredge from oyster bars in the Bay, the Choptank River, Potomac River, and parts of Tangier Sound.

Data collected from 121 locations showed the pattern of the 1959 oyster set typical of recent years. Very few bars had enough young oysters to provide useful seed. Many beds have a low rate of replacement, and most of the bottom area which produced oysters 50 years ago has no young oysters.

It was noted that while Maryland benefited in the upper reaches of Chesapeake Bay because of the dry spring and summer, Virginia's oyster crop suffered up to 50 percent mortality from a fungus which prefers unusually high salinities. In addition, the biologist stated, Virginia benefits from a rainy summer, when the upper bay generally has poorer oysters.

The scientist emphasized that the late fall 1959 survey was of broad open waters only; surveys in the spring of 1959 of tonging bars in tributaries revealed good sets of Bay oysters in several areas. The survey was the twentieth annual look at the oyster beds wherein Maryland research and management agencies cooperated.

* * * * *

OBSERVATIONS ON OYSTER SET IN MARYLAND WATERS, SUMMER-FALL 1959:

Except for Smith Creek, the summer and fall 1959 oyster-spate setting on test shells planted in Maryland's Chesapeake Bay waters was a little better than the 1958 set, but with no periods of heavy setting such as sometimes occur. Survival and growth of oysters were good in most areas. No evidence of unusual mortality was found except for an accumulation of oyster shells on Cinder Hill in Holland Straits. Many of these shells can be accounted for as a result of oxygen-depleted water invading the area in late 1958 when a fish kill and kill of crabs in pots also occurred. Oysters were fair to fat in the upper half of the Bay but generally poor elsewhere at the time of the survey. By mid-October the Chesapeake Biological Laboratory, Solomons, Md., stopped observing the set on test shells as there was little likelihood of any further set beyond that period since water temperatures in mid-October fell rapidly to levels at which oysters do not spawn.

The primary purpose of test-shell exposure is to determine the time and relative intensity of oyster setting on similar clean shell surfaces at a given location. The amount and type of fouling at different seasons also are shown. Counts of spat on test shells do not represent the commercial set present at the end of the season because many of the newly-attached spat are smothered or otherwise destroyed.

A marked spell of lower temperatures in mid-June 1959, following abnormally high temperatures in late May and early June, is believed to have caused a loss of early larvae and a delay in the start of the first wave of general setting. A period of exceptionally heavy rains in July may also have accounted for the dispersal and loss of larvae at that time. Fouling by barnacles and Bryozoa generally was light except

for a July barnacle set in Hooper Straits and the beginning of a heavy fall barnacle set during October in the Bay, lower Patuxent River, and Piney Island Swash.

A survey of oyster bars in Chesapeake Bay, Tangier Sound, Choptank River, and Potomac River was made in the fall of 1959 in cooperation with Maryland's Department of Tidewater Fisheries and the U. S. Bureau of Commercial Fisheries. This showed a generally better set than that of last year but again no heavy sets were found. Practically no setting occurred at the head of the Bay and along the western shore above Flag Pond (Calvert County). Catches on natural cultch generally ranging from about 20 to 150 per bushel were found along the eastern side of the Bay below Kent Point, the western side below Cove Point, in the lower Choptank River, Tangier Sound, and the extreme upper and lower parts of the Potomac River. The highest count recorded was 890 spat per bushel on newly-planted shells off Pry Cove in Holland Straits.

The smaller tributaries of the Chesapeake Bay, where setting usually is heaviest, were not examined. Especially in the southern half of the State, many of the spat were from a late set and were quite small. For that reason further counts were postponed until spring 1960 when the spat would be larger and less difficult to recognize in the field. (Special Oyster Bulletin, 59-29E, Chesapeake Biological Laboratory, Solomons, Md.)



Salmon

COLUMBIA RIVER CATCH NORMAL IN 1959:

The commercial catch of salmon and steelhead on the Columbia River in 1959 was quite comparable to that of recent years, about 7.05 million pounds.

The spring chinook run was down, summer-run chinook were in relatively good abundance, and although the fall chinook catch was the lowest on record, the escapement of fall chinook was quite good as compared with recent years. Egg takes of fall chinook at U. S. Fish and Wildlife Service hatcheries were second only to the record year of 1958. There has been an encouraging return of adult silver salmon to the Service's new Eagle Creek hatchery.

Three new hatcheries, constructed under the Columbia River Fisheries Development Program went into operation in the fall of 1959; they are the Gnat Creek hatchery in Oregon and the Kalama and Abernathy hatcheries in Washington.

HEARING ON FISH-HANDLING FACILITIES AT OXBOW DAM:

The Federal Power Commission granted the Idaho Power Company a hearing

on an existing order which prescribes the construction of permanent fish-handling facilities at Oxbow Dam in the Pacific Northwest. The hearing took place on December 7, 1959.

The Department of the Interior notified the Commission that it did not see the need for the scheduled hearing. The Department recommended that the Commission direct the company to proceed with the construction of the facilities already ordered for the Oxbow Dam powerhouse and that appropriate plans be developed for passing both upstream and downstream migrants at Hell's Canyon Dam.

The Company advocates the elimination of the fish protective facilities at Oxbow Dam and the construction of similar facilities at their lowermost dam, Hells Canyon. In so doing, the streams tributary to the Hells Canyon reservoir would be taken out of production and the fish would be subjected to a longer truck-hauling trip which, in turn, would subject them to greater hazards.



South Atlantic Exploratory Fishery Program

HARD CLAMS FOUND IN COMMERCIAL QUANTITIES OFF NORTH CAROLINA COAST:

M/V "Silver Bay" Cruise 20: Exploratory clam and scallop dredging and fish and shrimp trawling operations were conducted off the North Carolina coast during the 23-day cruise of the U. S. Bureau of Commercial Fisheries chartered fishing vessel Silver Bay, which ended on December 13, 1959.

CLAMS: Preliminary test fishing, using a 14-tooth Fall River clam dredge, from 10 miles west of Beaufort Inlet to Cape Lookout, N. C., yielded catches of hard clams (*Mercenaria* sp.) that indicate the presence of an extensive commercial clam bed from about 4 miles west of the inlet to Cape Lookout. This area (see Chart A p. 43) had been previously tested with a hydraulic dredge with unsatisfactory results. Catch rates

Chart A - M/V Silver Bay Cruise 20.

varied from 0 to $6\frac{1}{2}$ bushels per 30-minute drag throughout the area. Simulated commercial fishing using a single dredge at $34^{\circ}39.7'N$. lat., $76^{\circ}38.3'W$. long. (about two miles east of the inlet) in 4 to 6 fathoms, produced 45 bushels of large ($3''$ to $4''$) hard clams in 6 hours.

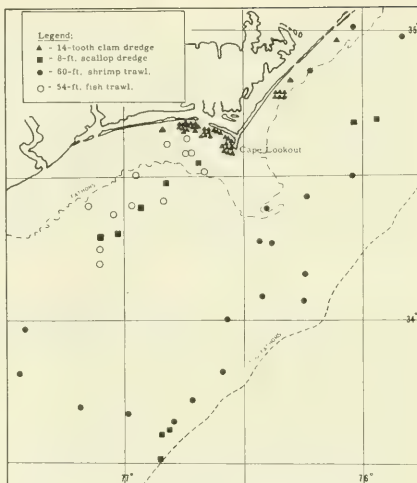
Dredging in the vicinity South and Southwest of Cape Lookout Bright produced clams at varying rates up to 5 bushels per hour. Seven stations south of Drum Inlet yielded large quantities of dead shells, but no live clams.

Clam sizes varied from $2''$ to $5''$, but were predominantly large or chowder size (over $3''$). One bushel yielded approximately one gallon of meats.

SCALLOPS: A total of 14 drags were made with an 8-foot scallopdredge (see Chart B). No new areas were located. Meat yield from sampling drags made in the previously reported area east of Core Banks ran approximately $3\frac{1}{2}$ pints per bushel--about 30 percent lower than during September 1959.

SHRIMP: No commercially-significant catches of shrimp were made during the cruise. A few white, brown, and pink shrimp were caught in some of the shallower trawl tows.

FISH TRAWLING: A 54/74-foot two-seam fish trawl utilizing 6-inch wooden rollers and constructed of $4\frac{1}{2}$ inch stretched-mesh netting was used at 31 trawling stations. Twenty-five of the drags were made between Cape

Chart B - M/V Silver Bay Cruise 20 (Nov. 21-Dec. 13, 1959).

Fear and Cape Lookout, N. C. Mixed fish catches were highest in the 12-14 fathom depth range with catches ranging from 350 to 3,400 pounds per hour.

Fig. 1 - A load of hard clams on the deck of the M/V Silver Bay.

Catches consisted primarily of small croakers, porgies (*Stenotomus*), and butterfish (7-8 per pound). Large anchovies were numerous in some of the drags.



South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, OCTOBER-DECEMBER 1959:

Oyster Research: The majority of South Carolina oysters are produced between the tides, but there are a few areas in the State where subtidal oysters are growing. These subtidal oysters are in areas of low salinity where the in-roads of boring sponge have been controlled by fresh water.

The seven-year cycle of extreme drought ended in 1947. Since then rainfall has been near normal. During the drought years the deep-water oyster beds gradually deteriorated. Now that salinity over the deep-water beds has returned to a more favorable low, the Bears Bluff Laboratories is undertaking a fairly large-scale rehabilitation of one of these oyster beds in the Ashepoo River. The potential deep-water beds in that river have been located and ranges for determining their exact position have been set up in the marshes upstream from the Interacoastal Waterway almost to Bennetts Point. This covers a distance of approximately 3,000 yards.

Intertidal oysters from a higher salinity area near the mouth of Ashepoo are now being moved to these deep-water beds. It is projected that several hundred bushels of seed will be moved monthly, so that the effect of seasonal transplantation can be noted. The entire program is planned sufficiently large to demonstrate the feasibility of rehabilitating the State's deep-water beds. It is realized that successful planting largely depends on continuing normal precipitation.

Damage to oysters in South Carolina as a result of Hurricane Gracie was apparently rather light and scattered. It is probable that this damage, evident in the form of excessive mortality in certain areas, was due in part to wave action associated with the ebb of the storm tide and in part to the excessive rainfall during the several weeks following the storm. Despite this rainfall, however, a heavy set of spat extending into the first week of October was noted in most areas.

Data accumulated over the past several years comparing the mortality, growth, and periods of best growth of oysters in the Laboratories' oyster pond and in racks under the Laboratories dock in outside waters, has been tabulated and consolidated.

Shrimp Research: Experimental trawling was carried out regularly throughout this quarter. Comparison was made of trawl catch records for November 10-December 8, 1958, and the same period in 1959, using catch per unit of effort as a measurement of abundance of croaker, spot, and commercial shrimp. Trawl stations were grouped into three categories: rivers, sounds, and offshore. Catch data was then tabulated to determine relative abundance at each of these areas for the 1958 and 1959 periods.

This analysis reveals that spot and brown shrimp, very abundant in the sounds and offshore in 1958, were few in number at all locations in 1959. On the other hand, croaker and white shrimp were found to have increased quite markedly in the rivers in 1959, and to a lesser extent in the sounds. The great increase in white shrimp possibly is the result of the high precipitation and correspondingly lower salinities observed during 1959. It is more likely, however, that the comparative abundance of white shrimp in 1959 represents the comeback of the species following the killing winter of 1957/58, during which practically all the brood stock was destroyed.

Pond Culture: A shallow, one-quarter acre experimental salt-water pond at Bears Bluff was drained December 1, 1959, just after the onset of cold weather. It was found that the drop in temperature had resulted in the total mortality of the commercial shrimp which had been stocked in the pond. The harvest was small—only 64 shrimp were collected when the pond was drained. Presumably the susceptibility to predators and low temperatures caused the failure of the shrimp crop in the pond. When the pond was refilled, the stocking of fluke in it was begun in an attempt to cultivation of that species. To date, a number of Southern fluke and small forage fishes have been released in the pond, and stocking will continue into next year.

The three commercial shrimp ponds built in the marshes near the upper end of St. Helena Sound, all suffered damage from Hurricane Gracie. In two of them the dams were completely breached, the flood gates washed away, and extensive repairs will be necessary. The third pond, more sheltered from the wave action of the hurricane, withstood the storm, but its dikes were completely inundated by hurricane tides, thus making the harvest from the pond suspect. The pond was harvested with difficulty in November 1959. The difficulties encountered were largely engineering. The results were not spectacular, but were sufficiently good to encourage further attempts at pond cultivation of shrimp as a commercial venture. (Progress Report No. 42, Bears Bluff Laboratories, Wadmalaw Island, S. C.)

Note: See *Commercial Fisheries Review*, December 1959 p. 59; October 1959 p. 36.



Striped Bass

MARYLAND HAS RECORD CATCH IN 1959:

The 1959 commercial catch of striped bass (or rock fish) was the largest in Maryland history, reports the State's Chesapeake Biological Laboratory, Solomons, Md. The supply of this fish also looks good for 1960.

The catch for the first nine months of 1959 was 3.8 million pounds, or 0.9 million pounds greater than the 12-months total for 1958. The 1958 catch was one of the best years previously reported.

The catch during the summer quarter (July, August, September), a traditionally slow period, was just above 0.5 million pounds in the Chesapeake Bay and tributaries, 50 percent greater than in the same 1958 quarter. Although the haul seines take the lion's share, only four-fifths of the gear was in use in 1959. The unusual summer catch followed record catches in the winter and spring of 1959.

The record catch verifies a prediction made last winter by the Laboratory, which also predicts that 1960 should equal or exceed 1958 and possibly 1959. If this

occurs, Maryland commercial fishermen will have three years of good striped bass catches.

The striped bass catches follow a general upward trend despite a continuing relatively stable commercial fishery and a mushrooming sports effort. Only one jarring note has popped up to date. The Director said "We've heard that sports fishing luck has been spotty. Some anglers did well, but others complained that fishing was poor in 1959.

"One thing is certain, as revealed by the commercial catch: the fish were out there to be caught--winter, spring, and summer.

"No one can say with certainty whether the over-all angling catch was poor or not," the Director continued, "because Maryland has no state-wide system for determining the sports catch. There is urgent need for accurate data on our tremendous and important recreational fishery. With such data, the research agency can vastly improve understanding of Maryland's fisheries, improve fish crop forecasting, and effectively aid in developing the wisest and best use of Maryland's fish."

He has proposed a starting point for gathering such information, by licensing for-hire boats and requiring regular catch reports. The proposal will be presented to the 1960 session of the Maryland Assembly.



United States Fishery Landings

JANUARY-NOVEMBER 1959:

Landings of fish and shellfish in the United States during the first 11 months of 1959 were about 9 percent more than for the same period of 1958. Landings, amounting to 4.3 billion pounds, were 336 million pounds more than in the same period of 1958, indicating that the domestic catch of fishery products for the year 1959 would amount to about 5.05 billion pounds.

The principal increase in production occurred in the landings of menhaden--estimated to reach 2.2 billion pounds by the end of 1959. Such an increase (approximately 636 million pounds) over the 1.5-billion-pound catch of 1958 would also exceed the record menhaden catch of 2.1 billion pounds established in 1956. A gain was also reported in the production of Alaska herring--up 21 million pounds over 1958. The Alaska salmon fishery, however,

Table 1 - United States Fishery Landings of Certain Species for Periods Shown, 1959 and 1958 1/					Table 2 - United States Fishery Landings by States for Periods Shown, 1959 and 1958 1/				
Species	Period	1959	1958	Total 1958	Area	Period	1959	1958	Total 1958
Anchovies, Calif. (1,000 lbs.)					Maine (1,000 lbs.)				
	10 mos.	2,400	6,922	11,008		10 mos.	241,400	286,101	316,955
Cod:					Massachusetts 2/:				
Maine	10 mos.	2,500	2,600	2,735	Boston	11 mos.	104,200	115,412	123,764
Boston	11 "	16,600	15,436	16,183	Gloucester	11 "	224,400	222,212	230,218
Gloucester	11 "	2,900	2,895	3,189	New Bedford	11 "	103,100	106,821	111,660
Total cod		22,000	20,931	22,107	Provincetown ..	11 "	26,700	24,885	25,754
Haddock:					Total Mass.				
Maine	10 mos.	3,000	3,600	3,997			458,400	469,330	491,405
Boston	11 "	67,900	78,593	81,509	Rhode Island 3/...	10 mos.	96,700	92,443	104,610
Gloucester	11 "	11,900	9,415	9,798	New York 3/	10 "	31,500	34,369	42,063
Total haddock ..		82,800	91,608	95,304	New Jersey 3/ ..	10 "	46,400	41,872	50,933
Halibut 2/:					North Carolina 3/ ..	10 "	54,200	49,133	54,866
Wash. and Oreg. ..	10 mos.	17,700	15,600	16,083	South Carolina 3/ ..	10 "	15,300	13,426	15,359
Alaska	10 "	21,500	20,000	20,000	Georgia	10 "	17,600	17,186	20,060
Total halibut ..		39,200	35,600	36,083	Florida 3/	10 "	107,100	120,189	158,724
Herring:					Alabama	8 "	9,600	6,906	10,343
Maine	10 mos.	109,100	154,100	170,977	Mississippi 3/	8 "	12,700	9,947	82,476
Alaska	Year	110,000	88,801	88,801	Louisiana 3/	5 "	24,000	28,800	75,237
Industrial fish:					Texas 3/	10 "	70,300	66,202	80,478
Maine & Mass. 3/	11 mos.	102,400	123,600	126,388	Ohio (Mar.-Sept.) ..	9 "	15,900	15,200	19,145
Mackerel, Calif.:					Oregon 2/	10 "	46,900	54,346	59,467
Jack	10 mos.	24,800	19,406	22,066	Washington 2/	10 "	124,800	133,463	164,367
Pacific	10 "	33,100	15,710	27,648	California 2/:				
Menhaden	Year	2,185,000	1,549,098	1,549,098	Certain species 4/	10 mos.	405,000	586,006	580,314
Ocean perch:					Other	7 "	50,900	52,504	94,570
Maine	10 mos.	65,300	63,847	71,068	Total Calif.		455,900	588,610	674,884
Boston	11 "	3,000	2,439	2,625	Rhode Island, Middle				
Gloucester	11 "	57,000	72,595	74,951	Atlantic, Chesapeake,				
Total ocean perch		125,300	138,881	148,644	South Atlantic, and				
Salmon:					Gulf States (menhaden				
Wash. 4/	10 mos.	36,400	49,118	54,363	only)	Year	2,149,600	1,545,265	1,545,265
Oreg. 4/	9 "	4,700	7,736	8,179	Alaska:				
Year		141,700	241,255	241,255	Halibut 5/	10 mos.	21,500	20,000	20,000
Sardines, Pacific .. thru Dec. 11					Herring	Year	110,000	88,801	88,801
		63,200	189,296	2,744	Salmon	Year	141,700	241,255	241,255
Scallops, sea, New Bedford (meats) ..					Shrimp	10 mos.	11,500	4,856	7,862
	11 mos.	17,500	14,330	15,233	Total of all above items ...		4,263,100	4,327,754	4,325,181
Shrimp (heads-on):					Others (not listed) ..		0	0	110,064
South Atl. & Gulf ..	10 "	182,300	161,344	195,058	Grand total		0	0	1,735,845
Washington	10 "	2,900	6,556	6,730	1/ Preliminary.				
Oregon	9 "	2,700	1,395	1,523	2/ Landed weight.				
Alaska	10 "	11,500	6,293	7,862	3/ Excluding menhaden.				
Squid, Calif.	9 "	15,700	4,862	7,457	4/ Includes catch of anchovies, jack and Pacific mackerel,				
Tuna, Calif. thru Dec. 5		265,700	299,810	304,094	Pacific sardines, squid, and tuna. Data on tuna are				
Whiting:					through December 5 and on Pacific sardines through				
Maine	10 mos.	23,300	23,577	23,577	December 11. Data on squid are for first nine months.				
Boston	11 "	600	581	596	5/ Dressed weight.				
Gloucester	11 "	62,100	58,603	58,927	6/ Data not available.				
Total whiting ..		36,000	32,761	33,100	Note: Data principally represent weight of fish and shell-				
Total of all above items ...		3,606,500	3,309,413	3,431,924	fish as landed except for mollusks which represent the				
Others (not listed)		397,100	618,341	1,303,921	weight of meats only.				
Grand total		4,263,600	3,927,754	4,735,845	experienced a disastrous year with the catch falling to a-				
1/ Preliminary.					bout 142 million pounds--nearly 100 million pounds be-				
2/ Dressed weight.					low the 1958 level and the lowest since 1900.				
3/ Excluding menhaden.					Compared with the same period of the previous year,				
4/ Landed weight.					California tuna landings through December 5, 1959, a-				
					mounting to 266 million pounds, were down 34 million				
					pounds and the catch of Pacific sardines through Decem-				
					ber 11--63 million pounds--was 126 million pounds less				

than the 1958 landings. In New England the catch of haddock was down 9 million pounds compared with the first eleven months of 1958 and landings of industrial fish (used in the manufacture of meal and oil) fell 21 million pounds during the same period. Landings of ocean perch and Maine herring, for which ten-months figures are available, were also down sharply.

Landings of shrimp were about 24 million pounds greater than in 1958. Most of the increase occurred in Louisiana, Texas, and Alaska. Landings in Florida were down sharply.

* * * * *

LANDINGS IN 1959 EXCEEDED 5 BILLION POUNDS:

The United States domestic fish catch in 1959 exceeded 5 billion pounds for the second time in history, according to the U. S. Bureau of Commercial Fisheries. The record was 5.3 billion pounds in 1956; the 1958 catch was 4.73 billion pounds. (Landed weight, except that mollusks are weight of meats only.)



Shrimp trawlers docked at Brownsville, Tex.

The catch of menhaden in 1959 of 2.2 billion pounds exceeded the previous record of 2.1 billion pounds landed in 1956.

For the first time, the landings of fish used for other than human food exceeded that used for human food.

The larger catch in 1959 was due to the big increase in the catch of menhaden. Menhaden is the Nation's most important industrial fish. The 1959 harvest of that species was more than half a billion pounds greater than the 1958 harvest, and more than offset, in poundage, the decreases in landings of salmon (100 million pounds), California sardines (130 million pounds), tuna (35 million pounds), Maine herring (45 million pounds), ocean

perch (13 million pounds), and haddock (9 million pounds).

The "other than human food" category includes menhaden (which in 1959 made up 43 percent of the total United States landings), Alaska herring (2 percent), other species used for pet and other animal food, and mussel shells manufactured into buttons.



U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, OCTOBER 1959:

Imports of edible fresh, frozen, and processed fish and shellfish into the United States during October 1959 increased by 18.1 percent in quantity and 16.3 percent in value as compared with September 1959. The increase was due primarily to higher imports of groundfish fillets and blocks (up 14.2 million pounds), and frozen shrimp (up 7.8 million pounds), and to a lesser degree, an increase in the imports of canned tuna in brine. The increase was partly offset by a 0.4-million-pound decrease in the imports of lobster and spiny lobster.

United States Foreign Trade in Edible Fishery Products, October 1959 with Comparisons						
Item	Quantity			Value		
	October	Year		October	Year	
	1959	1958	1958	1959	1958	1958
	(Millions of Lbs.)			(Millions of \$)		
Imports:						
Fish & shellfish:						
Fresh, frozen, &						
processed 1/ . . .	112.8	98.3	956.8	29.9	27.9	278.4
Exports:						
Fish & shellfish:						
Processed only						
(excluding fresh						
and frozen) . . .	6.3	11.1	41.2	1.9	5.8	15.6
1/Includes pastes, sauces, clam chowder and juice, and other specialties.						

Compared with October 1958, the imports in October 1959 were up by 14.8 percent in quantity and 7.2 percent in value due to higher imports of groundfish fillets and blocks (up 5.7 million pounds), frozen albacore and other tuna (up 4.6 million pounds), and frozen shrimp (up 3.8 million pounds). Lower imports of lobster and spiny lobster (down 1.2 million pounds) partially offset the increases.

United States exports of processed fish and shellfish in October 1959 were lower by 18.2 percent in quantity and 50.0 percent in value as compared with September 1959. Compared with the same month in 1958, exports in October 1959 were lower by 44.7 percent in quantity and 67.2 percent in value because of the light pack of California sardines and Pacific salmon available for export to foreign markets. Exports of Pacific salmon to the United Kingdom from the 1959 pack were made prior to October this year.

* * * * *

GROUNDFISH FILLET IMPORTS, NOVEMBER 1959:

During November 1959, imports of groundfish (including ocean perch) classified as fillets into the United States amounted to 4.3 million pounds, according to data obtained from the U. S. Bureau of Customs.

Canada was the leading supplier with 2.5 million pounds, or 58 percent of the month's total. Iceland was next with 1.5 million pounds. Imports from six other countries made up the remaining 302,000 pounds.

During the first eleven months of 1959, imports of groundfish and ocean perch classified as fillets (but not including fish fillet blocks since September 15, 1959) into the United States totaled 141.7 million pounds. Canada, with 73.2 million pounds accounted for 52 percent of the 1959 eleven-months total. Imports from Iceland (37.0 million pounds) represented 26 percent of the total, while Denmark followed with 14.1 million pounds, or 10 percent, and Norway with 11.4 million pounds, or 8 percent. Seven other countries supplied the remaining 6.0 million pounds, or 4 percent.

Note: See Chart 7 in this issue.



Wholesale Prices, December 1959

The December 1959 wholesale price index (122.7 percent of the 1947-49 average) for edible fishery products (fresh, frozen, and canned) continued to vary over a narrow range as compared with the preceding month (up 1.7 percent) and the previous nine months. The December 1959 wholesale price index was down 9.0 percent compared with the same month of 1958. The over-all wholesale price index in April 1959 stood at 122.7 percent and during the April-December

1959 period has varied from a high of 123.5 percent in June to a low of 119.8 percent in August. The December 1959 wholesale price index at 122.7 percent was the lowest since 1955 (122.6 percent).

Due to substantially higher wholesale prices for large drawn haddock at Boston and fresh round whitefish at New York, plus slight increases for frozen halibut and salmon, the drawn, dressed, and whole finfish subgroup price index increased 5.2 percent from November to December 1959. The increase was partially offset by lower wholesale prices for fresh yellow pike and Lake Superior drawn whitefish at Chicago. Compared with December 1958, prices were lower by 12.8 percent. All of the subgroup items were lower in December 1959 as compared with the same month in 1958. Prices for large drawn haddock at Boston were down 30.3 percent, Lake Superior whitefish down 38.0 percent, frozen halibut lower by 7.5 percent, fresh yellow pike down 5.2 percent, frozen king salmon down 3.2 percent, and round whitefish lower by 2.7 percent.



Fig. 1 - Unloading fish from a trawler at the Boston Fish Pier.

Fresh processed fish and shellfish wholesale prices in December 1959 were up slightly (0.4 percent) from the preceding month. Higher primary wholesale prices for fresh haddock fillets (up 8.9 percent) more than offset a drop of about 1/2 cent a pound in fresh shrimp prices at New York. Shucked oyster prices were unchanged from November to December. From December 1958 to December 1959, the subgroup index declined 9.1 percent, with prices for haddock fillets down 21.0 percent and fresh shrimp down 26.7 percent. Higher shucked oyster prices partially offset the lower prices for shrimp and haddock.

The wholesale price index for frozen processed fish and shellfish in December 1959 was about unchanged from the preceding month. Frozen headless shrimp at Chicago advanced (2.1 percent) for the second straight month and more than compensated for a 2.4-percent drop in frozen haddock and a 0.7-percent drop in flounder fillet prices. In December 1959 a sharp drop (23.7 percent) occurred in the wholesale price index for this subgroup as compared with the same month of 1958. The decrease was due to sharply lower prices for frozen shrimp down 29.5 percent, at Chicago, haddock fillets (down 24.4 percent), ocean perch fillets (down 12.9 percent), and flounder fillets (down 9.7 percent).

Primary broker prices for canned fish in December 1959 increased by a fraction of one percent due to a 50-cents a case increase in the California sardine price as compared with November 1959. The pack at the end of the season on December 31, 1959, of 745,000 cases was down 67 percent from the 2,256,000 cases packed in 1958. Other subgroup canned fish prices were unchanged from November to December 1959. Fish canning activity was confined largely to tuna in December. Nearly all canned items were in lighter supply at the end of 1959 as compared with the end of 1958. Increases in the primary prices for canned pink salmon (up 13.9 percent) and Maine sardines (up 3.3 percent) from December 1958 to December 1959 resulted in an increase of 5.6 percent in the canned fish subgroup index. Higher prices for those two items were partially offset by lower prices for California tuna (down 1.8 percent) and California sardines (down 3.1 percent).

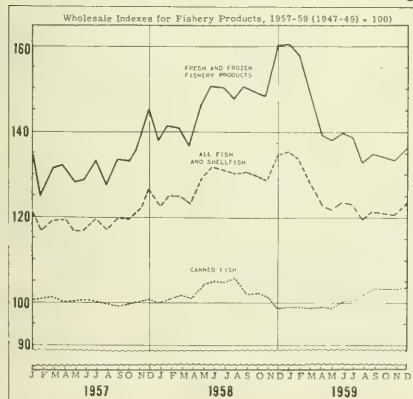
Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, December 1959 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ (\$)		Indexes (1947-49=100)			
			Dec. 1959	Nov. 1959	Dec. 1959	Nov. 1959	Oct. 1959	Dec. 1958
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					122.7	120.7	121.1	134.8
Fresh & Frozen Fishery Products:					136.4	133.4	134.0	160.1
Drawn, Dressed, or Whole Finfish:					154.8	147.2	153.8	177.5
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.16	.13	163.9	129.2	127.9	235.0
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.31	.31	96.4	95.9	98.5	104.2
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.76	.75	171.3	168.5	177.2	176.9
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.47	.73	115.3	179.7	185.9	185.9
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.88	.63	177.0	126.4	202.3	182.0
Yellow pike, L. Michigan & Huron, rnd., fresh .	New York	lb.	.59	.70	138.4	164.2	161.8	152.4
Processed, Fresh (Fish & Shellfish):					134.6	134.0	128.9	148.0
Fillets, haddock, sml., skins on, 20-lb. tins . .	Boston	lb.	.49	.45	166.7	153.1	144.6	211.0
Shrimp, lge. (26-30 count), headless, fresh . .	New York	lb.	.65	.65	101.9	102.7	98.7	139.0
Oysters, shucked, standards	Norfolk	gal.	7.00	7.00	173.2	173.2	167.1	148.5
Processed, Frozen (Fish & Shellfish):					106.8	106.4	106.4	140.0
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.38	.38	98.1	98.8	99.5	108.6
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.31	.32	97.3	99.7	102.0	128.7
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.27	.27	103.8	103.8	103.8	124.9
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.64	.63	98.4	96.4	95.3	139.6
Canned Fishery Products:					103.8	103.4	103.4	98.3
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	24.50	24.50	127.8	127.8	127.8	112.2
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.),								
48 cans/cs.	Los Angeles	cs.	10.80	10.80	77.9	77.9	77.9	79.3
Sardines, Calif., tom. pack, No. 1 oval (15 oz.),								
48 cans/cs.	Los Angeles	cs.	8.00	7.50	93.9	88.1	88.1	96.9
Sardines, Maine, keyless oil, No. 1/4 drawn								
(3-3/4 oz.), 100 cans/cs.	New York	cs.	8.75	8.75	93.1	93.1	93.1	90.1

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs.

These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

Note: Corrections for figures previously published: Indexes for September 1959: Fillets, flounder, skinless, 1-lb. pkg., 96.8.



SALES CONTESTS FOR WHOLESALERS DESCRIBED IN NEW LEAFLET

The Small Business Administration has recently issued a leaflet on sales contests for wholesalers. A well-planned contest can boost the salesmen's morale as well as increase the firm's sales. The five steps, outlined in this leaflet, that are involved in setting up a successful contest are: (1) establishing the purpose, (2) deciding on a scoring method, (3) selecting a theme and prizes, (4) promoting, and (5) awarding the prizes.

Write to the Small Business Administration, Washington 25, D. C., for a free copy of Sales Contests for Wholesalers, Small Marketers Aids No. 47.



FOREIGN

International

EUROPEAN FREE TRADE ASSOCIATION

CONVENTION INITIALED BY SEVEN EUROPEAN COUNTRIES:

The Convention for the European Free Trade Association (EFTA), to go into force on July 1, 1960, was initialed by Cabinet Ministers of Norway, Sweden, Denmark, Great Britain, Austria, Switzerland, and Portugal on November 20, 1959, at a two-day meeting in Stockholm. Initialing of the 400-page document followed a last minute British decision extending free trade status to frozen fish fillets on certain conditions.

The "Outer Seven" or EFTA representatives issued a communique emphasizing that establishment of EFTA was viewed as only a step toward an agreement among all 18 members of the Organization for European Economic Cooperation (OEEC), which also includes the six nations now joined in the European Economic Community or "Common Market," namely West Germany, France, Italy, Belgium, the Netherlands, and Luxembourg. Under the EFTA Convention, import tariffs in force on January 1, 1960, are due to be reduced 20 percent as of July 1. Subsequent tariff cuts, at the rate of 10 percent a year, are designed to achieve a free internal market among the Outer Seven after a 10-year transition period.

Following the Stockholm conference, the respective governments were slated to examine every provision in the convention, with the final signing expected to take place in mid-December. Thereafter, each of the national assemblies will consider ratification of the pact.

According to a dispatch appearing in the Oslo newspaper *Arbeiderbladet* for November 21, the dispute between Great Britain and Norway over the position of frozen fish fillets within the Outer Seven

area was not settled until the last minute. During the negotiations, Norway won acceptance of its principal objective, that all industrially processed fish products, including frozen fish fillets and frozen shrimp, should be considered as industrial products and thus enjoy free trade status within the Outer Seven area. At the end, British negotiators agreed to raise the joint Scandinavian quota for frozen fish exports to Great Britain from 20,000 to 24,000 metric tons a year over a transition period of ten years. At present, these exports total about 6,000 tons a year. Should frozen fish exports exceed the accepted quota to such a degree that they seriously disturb internal distribution in Great Britain, the whole question is to be re-examined. And if new negotiations fail to bring a solution, Britain reserves the right to impose import tariffs on all frozen fish from Scandinavia, including Norway.

The British Board of Trade President as well as the Norwegian Commerce Minister expressed the view that such an extreme development is virtually inconceivable. And the Norwegian Fisheries Minister said the British quota should allow for a natural expansion of the Norwegian fish filleting industry until 1970. (*News of Norway*, November 26, 1959.)

Note: Also see *Commercial Fisheries Review*, October 1959, p. 46.

FISH MEAL

INTERNATIONAL CONFERENCE OF MANUFACTURERS HELD IN SPAIN:

Representatives from 16 countries attended the International Fish Meal Manufacturers Conference in Madrid, Spain, during the latter part of October 1959.

By a unanimous vote it was decided that an International Association should be formed. This Association will be primarily for the purpose of promoting the exchange of scientific and technical information and of examining all matters

International (Contd.):

which are of general interest to the industry, such as standards of quality and International regulations and legislation. The President of the United Kingdom Fish Meal Manufacturers Association will be the Association's first president, and the Secretariat will be provided by the United Kingdom. (Fishing News, November 6, 1959.)

FOOD AND AGRICULTURE
ORGANIZATIONREPORT OF THE TENTH
SESSION OF THE FAO
CONFERENCE:

On October 31, 1959, the Food and Agriculture Organization (FAO) of the United Nations convened its Tenth Conference in Rome, Italy. Eighty-six nations participated in the proceedings of the Conference. Among these nations were a number from Africa who were admitted to membership or associate membership. Guinea, Cyprus, Nigeria, Somalia, Cameroon, and Togo were elected new members, the membership of all but Guinea being contingent on the attainment of independence in 1960. Chad, Gabon, Madagascar, Federation of Rhodesia and Nyassaland, Senegal, and Soudan were the new associate members.

The Conference, which is the chief legislative and policy-making organization of the FAO, had before it a wide variety of tasks including consideration of program of work and budget for 1960 and 1961; discussion of the state of food and agriculture throughout the world; constitutional, legal, and administrative matters; and such special topics as the proposed Freedom from Hunger Campaign and the Mediterranean Development Project. The meetings lasted three weeks and ended on November 20, 1959.

B. R. Sen, of India, was reelected Director-General of FAO for a four-year term. A 1960-61 budget of \$21,536,850 was adopted, of which \$1,491,605 was allocated to the Fisheries Division for the two-year period.

The U. S. Delegation to the Conference consisted of agriculture, fishery, forestry, nutrition, programming, and fiscal specialists from various Government departments, as well as representatives from industry. United States fishery advisers on the delegation included Sidney Shapiro, Chief, Branch of Special Reports, U. S. Bureau of Commercial Fisheries; Wilbert M. Chapman, Director of Research of the American Tunaboat Association; and Charles N. Carry, Executive Director, California Fish Cannery Association.

At the Conference's first plenary meeting, Richelieu Morris, of Liberia, was elected chairman. Commissions were then established to work on the various activities of the FAO. Commission I dealt with such matters as the world food and agriculture situation, the Freedom from Hunger Campaign, and the Mediterranean Development Project. Commission II dealt with the current and future activities of the various technical divisions of FAO. Commission III was concerned with constitutional, administrative, and financial problems. The work of the fishery advisers on the U. S. Delegation was conducted primarily in the Technical Committee on Fisheries, established under Commission II.

Technical Committee on Fisheries: The first meeting of the Technical Committee was held on November 3, at which time it adopted the agenda and appointed A. L. Pritchard of Canada, Chairman, and T. S. Leach of the United Kingdom and S. F. Humphrey of Australia, Vice Chairmen. Representation at the meetings of the Technical Committee was excellent, delegates from 46 countries being present.

At the opening session of the Fisheries Committee, Dr. D. B. Finn, Director of FAO's Fisheries Division, made a general statement emphasizing future programs. Key points in his talk were the



Fig. 1 - United States Delegation to FAO's 10th Conference held in Rome, Italy.

International (Contd.):

need for resource appraisal and for establishing fishery administrative systems in underdeveloped countries. He also noted that there is a lack of skilled personnel available to conduct FAO's fisheries programs. R. H. Fiedler, Chief of the Program Coordination Service of the Fisheries Division, discussed the Expanded Technical Assistance Program. The meeting then proceeded with a report by Allan Tubb, Executive Secretary of the In-

ternational Technology, and Economics reported on their present and future programs of work.

United States Proposals for World Conferences:

The Technical Committee recognized the value of holding world conferences in various fishery fields as a potent means of furthering the objectives of FAO. The reports of such conferences of experts form the basis for creative action, and determine the direction that future activities should take.



Fig. 2 - Delegates at the opening Plenary Session of FAO's 10th Conference held in Rome, Italy.

do-Pacific Fisheries Council (IPFC). He was followed by Mr. Girard, Executive Secretary of the General Fisheries Council for the Mediterranean (GFCM). At subsequent sessions of the Technical Committee, the Chiefs of the Branches of Biology,

Two major proposals by the U. S. Delegation for world conferences were accepted and written into the report of the Technical Committee. The first proposal, dealing with a world conference on the tunas and related species, was received favorably,

International (Contd.):

and the Committee requested the Director-General to go into the possibility of organizing this symposium as a joint activity of the Fisheries and Nutrition Divisions, subject to the availability of funds.

Regional Fishery Organizations: The Committee requested in a resolution that the Director-General explore the possibility of establishing a regional fishery consultative body for West Africa, similar to the Indo-Pacific Fisheries Council and the General Fisheries Council for the Mediterranean. Another resolution requested the Director-General to study the possibility of creating a regional fisheries commission to serve the Governments of the American countries of the South Atlantic in a form similar to that of other FAO regional fisheries councils or commissions.

REPORT OF THE TECHNICAL COMMITTEE IN FISHERIES: At the fifth meeting of the Technical Committee on Fisheries, the delegates approved a report, which was then presented to Commission II. Subsequently the report was adopted with minor changes by the Conference. The report is as follows:

204. Fisheries: The Conference considered that the proposed program of work in the field of fisheries was well conceived and that, within the limits of the funds available, a balanced selection had been made of the fields of activity undertaken. It therefore approved the projected activities as set out in Documents C 59/3 and C 59/FI/4, subject to the comments which follow.

205. The Conference emphasized that the Director-General should endeavour to select for continuous work those biological, economic, technological, and other activities which are fundamental to the aims of the Organization. It was in this context that the Conference considered in detail the proposed program.

206. The Conference laid considerable stress on the need for an integrated approach to fishery problems. It noted with satisfaction that all the branches of the Fisheries Division were collaborating intimately in carrying out the program and expressed the hope that these working relationships would continue.

207. The Conference suggested that the Director-General, in reviewing future trends should endeavor to ensure that adequate resources were made available to the Fisheries Division to enable it to meet more fully the increasing demands by many Member Governments for services arising from growing concern with fisheries development, taking into account the over-all needs of the Organization.

208. The Conference recognized that the holding of expert meetings in various fishery fields was one of the most potent means of furthering the objectives of the Organization; in this connection, the comprehensive reports emerging from such meetings, for instance, those on Costs and Earnings of Fishery Enterprises, on the Economics of Fisheries, on Boats, and on Gear had broken new ground and formed the basis for new creative thought and action and for the direction that future activities and research should take. This

was also the case with the meetings on Fishery Cooperatives and on the Biology of Sardines, the printed reports of which were not yet available. The Conference also endorsed and commended the extensive use of consultants as an effective means of dealing with the very wide range of subject matter covered by the Fisheries Division.

209. The progress of the Expanded Technical Assistance Program was noted with satisfaction, but the downward trend in requests from governments for assistance in the field of fishery economics was regretted, in view of the importance of this discipline in evolving fisheries development programs. Closer technical supervision of recipients of fellowships was suggested. The Conference noted that the Organization was likely to be invited by the UN Special Fund to act as Executing Agent for two fishery projects in the near future, and that this would place an additional load on the professional staff of the Fisheries Division.

210. Fisheries Biology: The Conference noted with regret that due to lack of funds certain documents of the greatest value, such as Fishing Gear of the World, and the Current Bibliography for Aquatic Sciences and Fisheries, were published in English only and that this situation was likely to persist for the ensuing biennium. The Conference therefore requested the Director-General to avoid the recurrence of similar situations either through an increased over-all budget allotment for publications, or a suitable revision of the publications program in order that all documents published be available simultaneously in the three official languages of FAO.

211. The Conference endorsed the work being carried out and the program proposed in the field of fisheries biology. The Conference commended the progress made in the development of a methodology for collecting and storing information over a very wide field, and recognized that by these methods the production of a wide series of documents was made possible. The Conference also endorsed the proposal to publish in English the Current Bibliography for Aquatic Sciences and Fisheries (hitherto an internal document), in printed form through the medium of a commercial publisher, as an exceptional measure. The Conference also approved the preparation and issue of a series of manuals on a wide variety of biological and oceanographic subjects.

212. It was noted that during the biennium a number of fruitful expert meetings and training centers had been held; these included the World Scientific Meeting on the Biology of Sardines and Related Species, and the Training Center on the Methodology and Techniques of Research on Mackereel (Rastrelliger), the reports on which had proved particularly timely and valuable. The Conference approved, subject to the availability of funds, the continuation of a series of such meetings in the ensuing biennium especially dealing with important species of fish. The program for 1960/61 already included one on the Biology of Tuna, and a second, a Symposium on Fish Culture which would embrace biological, technological and economic aspects of the subject matter. A meeting on Hilsa should be held in the ensuing or a succeeding biennium if funds permitted.

213. Some delegations recommended further regional fishery studies such as that on the Me-

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kong River Basin; other delegations stressed the need for FAO assistance with the establishment of a training and research institute in inland fisheries at an appropriate place in the area. Some delegations also recommended that the problems arising from pollution of marine and inland waters should receive special attention. The Conference requested the Director-General to give these matters the attention that available staff and funds would permit.

214. The Conference commended the collaboration which the Organization had developed with other international governmental and nongovernmental organizations, specifically the relations with UNESCO and the International Scientific Unions, on fishery aspects of oceanographic research, especially in the Indian Ocean. It also noted with pleasure the acknowledgment contributed by the Observer from the International Union for the Conservation of Nature and Natural Resources, of fruitful collaboration with that body.

215. Fisheries Technology: The work accomplished in the field of fisheries technology was commended and the programs in the fields of fish processing and of fishing craft and gear were endorsed. The Conference noted that during this biennium the Second World Fishing Boat Congress had been held during the biennium with successful results.

216. The Conference requested the Director-General to examine the methods being used in the production of the *World Fishery Abstracts*, especially with respect to its relation with other publications, and with due regard for the audience for which these Abstracts were intended. The Conference, however, suggested that no radical changes should be introduced without consulting with Member Governments.

217. The Conference endorsed the practical field work in fishing gear and methods technology performed during the biennium, and appreciated the initiation of research work in this field, that had already led to valuable results.

218. The Conference noted the initiation of studies on the safety of life at sea, where applicable to fishing craft, with special reference to the question of stability, expressed the hope that this matter would be kept under continuous review, and requested the Director-General to explore the possibility of establishing a standing committee to consider these matters so as to provide criteria for the consideration of Member Governments.

219. The Conference recognized the value of the work being undertaken on the design of fishery research vessels. It was suggested, however, that in order to relieve the pressure on the small staff available for this work, activities accepted by the Organization should be restricted to the organization of expert meetings, the exchange of information and, where specifically required by Member Governments, and as the budget allowed, to design studies to serve as a basis for further work by fishing vessel designers outside FAO, and to advice on plans submitted.

220. The Conference noted with approval the development of recent work on the improvement

of traditional methods of fish processing and the development of new fishery products. It also requested the Director-General to look into the possibility, subject to the availability of funds, of organizing a symposium on the Nutritive Value of Fishery Products as a joint activity of the Fisheries and Nutrition Divisions.

221. Fisheries Economics and Statistics: The Conference was gratified with the work carried out in fishery economics, statistics and related fields, endorsed the program proposed, and noted that the work was fundamental to any sustained fishery. It hoped the work would be intensified, especially in regard to fishery institutions and services, cooperatives and statistical methods. The Conference noted the small number of professional staff members engaged in this field and the breadth of the subject matter covered, and hoped that the number of staff allocated to this sector would not fall below the minimum essential to carry on the work.

222. Some delegations hoped that the Fisheries Economics Branch of the Fisheries Division would be strengthened from both the budgetary and personnel points of view, so as to be able to carry out satisfactorily the intensified work mentioned above.

223. The Conference recognized the fundamental importance of economics and statistics as an indispensable basis for the entire work of the Fisheries Division, and that its effective operation required that the biological, technological and economic experts should operate on a coordinated basis to conduct a thoroughly rounded fisheries program. In this context, some delegations stressed the desirability of retaining the Fisheries Statistics in the Fisheries Division, but agreed upon the desirability of maintaining close contact with the Statistics Division.

224. The Conference noted with appreciation the progress reported in the improvement and simplification of fishery statistics, took note of the Report of the Expert Meeting on Fishery Statistics in the North Atlantic area (Edinburgh, 1959), and recommended that this work should be followed up in the terms of the following resolution:

Resolution No. 23/59

FISHERY STATISTICS IN THE
NORTH ATLANTIC AREA

THE CONFERENCE:

Notes with satisfaction that the Expert meeting on Fishery Statistics in the North Atlantic Area, organized by FAO, co-sponsored by the International Council for the Exploration of the Sea and the International Commission for the Northwest Atlantic Fisheries, and held in Edinburgh, Scotland, 22-30 September 1959, has agreed on recommendations to governments and international organizations designed to improve and considerably simplify the collection and reporting of fishery statistics in the North Atlantic area,

Accepts the recommendations of the Meeting that FAO should transmit its report to the governments and international organizations concerned with the request

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that they consider implementation of the recommendations contained in it,

Accepts further that FAO should, in due course, publish a fully documented edition of the report.

Welcomes the suggestion of the Meeting for the establishment of a Continuing Working Party on Fishery Statistics in the North Atlantic Area to keep under continuous review the progress made in the implementation of the recommendations of the Meeting, consult with the officers of governments and of international organizations with respect to difficulties encountered and, keeping in mind the actual state of fishery statistical services in the different countries, make suggestions for further national and international action in its field to governments and international organizations as appropriate,

Agrees that the Working Party should consist of one governmental expert each nominated by the Governments of Canada, the Federal Republic of Germany, Iceland and the United Kingdom, one expert each nominated by the Secretary-General of the International Council for the Exploration of the Sea and the Executive Secretary of the International Commission for the Northwest Atlantic Fisheries, one expert nominated by the Director-General of FAO, and such additional experts as may be nominated by the Working Party itself, and

Authorizes and requests the Director-General to establish the Working Party in accordance with Article VI of the Constitution and to arrange, as requested by the Meeting, for the FAO Fisheries Division to function as secretariat for the Working Party.

225. The Conference commended the highly efficient performance of the Fisheries Division in the Yearbook of Fishery Statistics, not only as to its timeliness of issue and technical soundness, but also as to its convenience of format and increasing coverage, all of which were of the greatest value to Member Governments. The Conference noted that the staff producing the Yearbooks was also engaged on other essential activities of the Division, and that the efficiency of their work was enhanced by their close contact with other fishery specialists in the Division.

226. The Conference in endorsing the proposed program of work on fishery economics, statistics and related fields, specially referred to the proposal to hold a technical meeting on financial assistance to fishery industries, in order that administrators of credit and subsidy schemes in Member Countries should have an opportunity of exchanging experience and of reviewing methods of handling such matters.

227. The Conference endorsed a recommendation of the Fourth FAO Regional Conference for

Asia and the Far East for holding, under the Expanded Technical Assistance Program, a Seminar in Fish Marketing in the Indo-Pacific Region at the invitation of Malaya, as soon as funds permitted.

228. Activities in the Regions: The Conference approved the Report of the Indo-Pacific Fisheries Council (IPFC) on its work in 1958/59 (C 59/FI/2) and endorsed the program of the IPFC for the next biennium subject to the availability of funds. It recognized that the subject matters to which the IPFC had directed its attention had a great deal in common with those that fell within the responsibility of the outposted fishery officers in the region, and that the staff of the Fisheries Division, in servicing the Council, were thereby enabled to carry out more effectively the Organizations fisheries program in the region.

229. Some delegates from the Indo-Pacific region asked that the attention of the Director-General be drawn to the need for assisting Member Governments in strengthening fishery administrations and research services, in order to develop a sound institutional and scientific basis for the development of the fisheries in the region.

230. The Conference approved the Report of the General Fisheries Council for the Mediterranean (GFCM) on its work in 1958/59 (C 59/FI/3), and endorsed the program of the GFCM for the next biennium.

231. The Conference noted the growing volume of the work in the Regional Fishery Office for Europe and the Middle East, due not only to normal representational work in the region, but also to the growing output of the General Fisheries Council for the Mediterranean, and to the formation of the European Inland Fishery Advisory Commission. The Conference therefore approved the Director-General's proposal to strengthen the staff of this office by the appointment of an additional Regional Fishery Officer to be stationed in Cairo; this appointment had originally been recommended by the 4th FAO Near-East Regional Conference, Damascus, 1958.

232. The Conference requested the Director-General to explore the possibility of setting up a fisheries consultative body for the Near East.

233. The Conference noted with approval that effect had been given to the decision at the 9th Session of the Conference to form the European Inland Fisheries Advisory Commission. Fourteen countries had already indicated their interest in taking part in the work of the Commission, which would hold its first meeting in Dublin in April 1960, at the invitation of the Government of the Republic of Ireland.

234. The Conference noted that the post of Regional Fishery Officer in Africa authorized by the Ninth Session of the Conference had been filled. Delegates from West African countries expressed their interest in the establishment of a regional fisheries consultative body in West Africa, and in the following resolution, which it adopted, the Conference requested the Director-General to explore this possibility:

International (Contd.):

Resolution No. 24/59

REGIONAL FISHERY CONSULTATIVE BODY
WEST AFRICA

THE CONFERENCE:

Considering that the States and Territories of the West African Region members of FAO are desirous of developing the fisheries of that area,

Noting that these States and Territories have many common problems connected with such development and that they wish to co-operate amongst themselves in planning and carrying out work that will forward such development and also to exchange fisheries information in order to keep abreast of new knowledge, and

Noting further how successful the Indo-Pacific Fisheries Council and the General Fisheries Council for the Mediterranean have been in developing fisheries in the Indo-Pacific and the Mediterranean areas respectively,

Requests the Director-General to explore the possibility of establishing a body in the western part of the African Region to serve that area in a manner similar to that in which the IPFC and the GFCM serve their areas.

235. The Conference noted that the outposted fishery staff in the Latin American Region, as authorized at the Ninth Session of the Conference, had been strengthened by the appointment of a Regional Fishery Officer at Rio de Janeiro.

236. The Conference noted that only two notifications of acceptance of the draft agreement for the establishment of a Latin American Fisheries Council had so far been deposited. This matter is reported further in paragraphs 632-633 of this Report.

237. The Conference now took the view that in Latin America smaller groups of States might more readily find matters of common interest in the field of fisheries, in contrast to the wide scope of the earlier proposal for a Latin American Fisheries Council, which had been open to all the States in Latin America. The Conference, in this context, adopted the following Resolution introduced by Argentina on behalf of the Delegations of Argentina, Brazil and Uruguay:

Resolution No. 25/59

REGIONAL FISHERIES CONSULTATIVE BODY
WESTERN SOUTH ATLANTIC

THE CONFERENCE:

Considering that Agreement for the establishment of the Latin American Fisheries Council has not been ratified by the neces-

sary number of countries to enable the Council to come into being,

Observing that the American States of the South Atlantic (Argentina, Brazil, and Uruguay) have expressed particular interest in co-operating among themselves on common problems in order to promote fuller use of the marine resources in the Western-South Atlantic in accordance with sound economic and scientific principles, to coordinate studies, research and techniques and to determine their common needs,

Recognizing that the general objectives of the proposed Latin American Fisheries Council could best be achieved within a limited area comprising a number of countries which, through their geographical location, have problems in common and which are disposed to coordinate their activities in order to advance the development of their fisheries industries,

Requests the Director-General to study, together with the Governments of the American countries of the South Atlantic concerned, the possibility of:

- (a) Creating a Regional Fisheries Commission to serve the said zone in a form similar to that of other FAO Regional Fisheries Councils or Commissions, and
- (b) Developing a coordinated project of fisheries technical assistance in the said region and advising the Governments concerned on the best way of implementing the same.

238. Future Trends: As regards future trends, the Conference requested the Director-General to take into account the following suggestions if, at some future time, additional funds should become available.

239. Greater emphasis should be placed on the institutional and structural aspects of fisheries generally.

240. Work should be intensified in the fields of fish marketing and distribution, fishery co-operatives; and, in particular, detailed study should be made of productivity in marine and inland fisheries and of the problem, of the protection and conservation of marine fishery resources.

241. Work on the appraisal of fishery resources should be intensified and the problems of exploitation examined from the biological, economic, and technological points of view.

242. A series of forecasts by continents of the trends of output over the ensuing ten years should be undertaken, if possible.

243. The Conference noted the opportunities which were available to Member Governments for contributing to freedom from hunger by promoting increased consumption and production of fish and fish products; it stressed the increasing signifi-

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cance of the fisheries in those parts of the world which still suffered from malnutrition, especially for those people whose diets lacked high quality protein. It suggested, therefore, that within the general work of FAO to promote freedom from hunger, considerable attention should be paid to fisheries.

—By Sidney Shapiro, Chief, Branch of Special Reports,
Division of Industrial Research and Services,
U. S. Bureau of Commercial Fisheries,
Washington, D. C.

Note: Also see *Commercial Fisheries Review*, February 1958, p. 52.

GENERAL AGREEMENT ON
TARIFFS AND TRADEFIFTEENTH SESSION OF THE
CONTRACTING PARTIES:

The Fifteenth Session of the Contracting Parties to the General Agreement on Tariffs and Trade (GATT), held at Tokyo, ended November 20, 1959. Representatives of the 37-nation trade agreement group achieved further progress in removing barriers to world trade.

Balance-of-Payments Import Restrictions: A drive to eliminate discrimination against American and other dollar area exports was the highlight of the Session. The urgency of moves in this direction was touched off by the strong declaration of the United States at the opening Ministerial Meeting. The restoration of external convertibility to the main trading currencies of the world has removed any balance-of-payments justification for discriminatory restrictions by countries whose export earnings are largely in convertible currencies.

The drive to eliminate discrimination was greatly aided by the International Monetary Fund's decision of October 23 calling for removal of discriminatory restrictions with all feasible speed. This decision, which was made available to the Contracting Parties at the Session's opening, supported the strong statements against discrimination and restrictions made by the United States and other ministerial level speakers.

The Contracting Parties adopted a report which concluded that discrimination in trade on balance-of-payments grounds should quickly be ended. It indicated that the justification for such discrimination had been almost completely eliminated by convertibility of currencies.

The United States and many other countries also stressed the need to reduce the use of all import quotas by countries emerging from balance-of-payments difficulties.

Several countries took important steps to relax their trade controls and reduce discrimination during the Session. Among them were the United Kingdom, France, Japan, Sweden, and the Netherlands.

Other countries (including Australia, New Zealand, Malaya, Rhodesia and Ghana) were able to point to recent measures of a similar character.

Previously scheduled balance-of-payments consultations were held with six contracting parties: Australia, Japan, the Federation of Malaya, Norway, the Federation of Rhodesia and Nyasaland, and Sweden.

Expansion of International Trade: Three committees on the expansion of international trade, which have been meeting during the intersessional period, met again during the Session.

Committee I, on tariff reductions, submitted final recommendations setting forth the rules and procedures to be followed in the tariff conference to be held in Geneva in 1960-61. This conference will be divided into two phases: (1) The principal emphasis in the first phase (September through

December 1960) is to be on tariff negotiations and renegotiations incident to the formation of the European Economic Community. (2) The second phase, beginning in January 1961, is to be devoted to an exchange of new concessions among contracting parties and to negotiations with countries acceding to the GATT.

Committee II conducted its second round of country-by-country consultations on agricultural policies. The consulting countries were Burma, Ceylon, Malaya, Indonesia, and Rhodesia and Nyasaland. During the coming year there will be further rounds of consultations, at the end of which the Committee will report on the effects of agricultural protection upon international trade. The presentation of United States agricultural policy is scheduled for February 1960. (Fishery policies will be included with agricultural policies in some instances.)

Committee III is seeking ways of expanding the export earnings of the less developed countries as a means of accelerating their development and making them less dependent upon foreign aid. In a preliminary report, the Committee identified some of the obstacles to increased trade encountered by the less developed countries in foreign markets. These obstacles include high revenue duties, preferential arrangements, import quotas, and restrictive state trading, in addition to high tariffs. The Contracting Parties approved the Committee's recommendation that individual governments examine such measures of theirs as may impede the trade of less developed countries.

Avoidance of Market Disruption: During the discussions at the ministerial level the United States drew attention to the fact that sharp increases in imports, over a brief period of time and in a narrow range of commodities, can have serious economic, political, and social repercussions in the importing countries. He pointed out that the problem is to find the means to ameliorate the adverse effects of an abrupt invasion of established markets while continuing to provide steadily enlarged opportunities for trade. The subsequent discussions made it evident that the apprehension that such situations might arise had led some countries to maintain or impose import restrictions against particular imports from some countries.

The question was discussed in Plenary Session and it was agreed that, in view of the complex nature of the problem, the question should be deferred until the Sixteenth Session. Meanwhile, the Executive Secretary will prepare a factual report for the Contracting Parties. At the Sixteenth Session the Contracting Parties can consider whether to establish a panel of experts to examine the problem or whether some other method of approach is likely to be more appropriate.

Regional Market Arrangements: The Contracting Parties received reports on three movements toward regional economic integration.

The Swedish ministerial representative reported on the negotiations for a European Free Trade Association (EFTA) which Austria, Denmark, Norway, Portugal, Sweden, Switzerland, and the United Kingdom—the so-called Outer Seven—are negotiating. He said that the EFTA countries would continue to be bound by their GATT obligations in carrying out arrangements for progressive abolition of tariffs and quota restrictions on trade among the member countries. The first step in this process is to take place on July 1, 1960. He assured the Contracting Parties that EFTA does not intend to use quantitative restrictions in order to create a preferential trading system.

Delegates to Brazil, Chile, Peru, and Uruguay and observers for Argentina and Bolivia spoke about the plans of these countries to establish a free trade area. They referred to the draft treaty prepared at Montevideo last September, which is to take final form in February 1960. The delegates pointed out that the proposed free trade area was intended to increase trade and help raise living standards, and that improvement in economic conditions in Latin America would lead to increased trade with other countries.

A spokesman for the Commission of the European Economic Community (EEC) or "Common Market" gave the Contracting Parties an account of the progress of the EEC during 1959. He noted that the provisions of the Rome

International (Contd.):

Treaty regarding reduction of customs duties and relaxation of quota restrictions in intra-EEC trade had been carried out on schedule, and that many tariff reductions had also been extended to the products of outside countries. He stated that the Commission hopes to submit proposals on agricultural and fishing policy to the EEC Council of Ministers before the end of 1959. He said that the EEC draft external tariff was receiving urgent attention, so that it would be ready in ample time to allow for preparation for the 1960-61 tariff conference. The representative spoke of the EEC's interest in helping countries in the process of economic development.

Other Items: Specific commodity problems were pursued bilaterally and informally by the United States Delegation at the Fifteenth Session with a number of other delegations, including those of Japan, France, Italy, the Federal Republic of Germany, Norway, Australia, Belgium, the Netherlands, and the Federation of Rhodesia and Nyasaland. The conversations are expected to result in the relaxation of some import restrictions on certain United States products in the very near future.

INTERNATIONAL OCEANOGRAPHIC CONGRESS

FISH BEHAVIOR STUDIES COULD INCREASE YIELD:

A school or "congregation" of cod is a social organization with one dominant male and a whole hierarchy of inferior or less aggressive males set in an established scale, according to Dr. H. O. Bull of England, who reported to the International Oceanographic Congress at the United Nations, New York City, in September 1959. "Each male defends his chosen territory against invasion by other males but females can wander freely throughout the social order," he said. At spawning time, each female is pursued in a courtship dance with a male that may last for fifteen minutes before the eggs are laid and fertilized.

"Such studies of the psychology and social behavior of the commercial food fishes are essential if the fish harvest is to be increased," said Dr. Bull of the Dove Marine Laboratory where he has been studying cod in a tank 20 feet long, 5 feet deep, and 5 feet wide. The grunting noises made by the male during courtship, for instance, can be clearly picked up by microphones and could be used to locate schools of cod. Dr. Bull recommended that ocean fish be studied by close observation of their behavior in aquariums to lay the basis of more successful large-scale fisheries.

"There are three things that make an ocean fish suffer: light, temperature, and too little salt in his bath. All three increase his rate of respiration and his

heartbeat," reported Professor H. H. Friedrich, Institute for Marine Research at Bremerhaven in Germany, to the Oceanographic Congress. The fish cannot stand the combination of bright light in warm water and either get away or succumb. Tropical fish stay away from the surface for this reason and most fish seek the cooler and darker waters well below the surface.

Dr. Friedrich said that, on the other hand, the habits of many ocean fish are related to the phases of the moon so that they seem to be sensitive even to faint light. Echo-sounding devices that are used by trawlers to measure the depth of the water and to locate schools of fish by their echoes do not bother the fish. They seem not to notice them, but when sounds are used as signals for feeding time, the fish do respond to them.

Dr. N. K. Panikkar, Chief of the Fisheries Development Office in New Delhi, India, chairman of one of the meetings at the Oceanographic Congress, cited research on fish behavior as of prime importance to any country that depends on seafood for part of its food supply. In India there are usually large catches of sardines, mackerel, and shrimp, but the fish population fluctuates widely. In one year, 200,000 metric tons of sardines are caught while in the next year there may be almost none. The reasons are unknown. The psychology of fish behavior and habits needs international research.

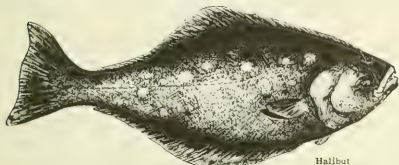
Professor Trygve Braarud of the Institute for Marine Biology of Oslo University, Norway, reported on the production of plants in the ocean, but plants so small that they are like grains of dust. The amount of production of these microscopic plants is at least equal to the production of all the land plants put together. He said that these plants--phytoplankton--contain many valuable minerals and vitamins and even antibiotics and that the explanation of fish aggregation may be partially due to the prevalence of these organisms. "There exists in the sea," he said, "areas like land deserts which can be explained by this phenomenon." He called for further research in this field as a possible food resource for men, land animals, and fish.

International (Contd.):

INTERNATIONAL PACIFIC HALIBUT COMMISSION

EFFECTS OF FISHING EFFORT
VERSUS CLIMATIC CHANGES ON
FISH STOCKS EVALUATED:

The controllable effects of fishing should be compared with the uncontrollable forces of nature in studying the effects of climatic-temperature changes. This is the advice to fishery managements given in a report on the commercial yields of Pacific, Atlantic, and North Sea fisheries to the Fisheries Research Board of Canada by F. Heward Bell and Alonzo I. Pruter of the International Pacific Halibut Commission. Their report points out that in their opinion inadequate provision has been made in some instances for changes in the amount of fishing, in economic conditions, or in the efficiency of the fishing fleets.



Halibut

"It has been usually believed that abundance has been little affected by fishing, natural fluctuations appearing to transcend by far the effects of man. However, lately this belief is being challenged. Hodgson, supported by Cushing and Burd (1957), provides some evidence that fishing has reduced the size of herring stocks. . . . For some demersal species, particularly the flatfish such as the Pacific halibut, sole, or brill the stocks seem to have been more responsive to fishing than to natural fluctuations."

Determination of stock sizes and their maximum utilization cannot be adequately resolved until fishing versus environmentally-induced changes in fish populations are each placed in their proper perspective, say the authors.

Regarding the possible effects of air and water temperatures on fish stocks, the report points out that on the north Icelandic offshore coastal area there is a long-term resemblance between sea-surface temperature and air temperature, but over short terms of 10 to 20 years the trends may be very dissimilar and frequently in opposite directions.

Extremely cold or unusually warm air temperatures during one month or over a limited period of the year were unlikely to be immediately reflected in midwater or bottom temperatures in the oceanic regions where halibut spawn, and where the eggs and larvae appear to spend their early existence.

Even within a restricted coastal area, such as that of North Iceland, long-term sea-surface temperature trends in some months may be very different between locations in close proximity.

In the examination of fishery statistics bearing on these matters, the authors suggest that wherever possible catch per unit of effort values should be used rather than production (landing) values.

They declare that the current belief, that the yield or size of stocks of demersal fish in the Barents Sea have been mainly influenced by long-term climatic changes, must be re-examined.

"Fishing in such distant waters, particularly Greenland, has been made possible due to the technological developments of the past 30 to 40 years. Mechanical refrigeration, oil rather than coal for generating steam, dieselization, depth finders, electronic positioning, and many other navigational devices, all have aided in the profitable expansion of the range of fisheries.

"The warming of the waters may have played a far less important role than is generally accepted in affecting the pattern of stock changes and of annual yields. Also, while it is true that the warming of the seas could increase productivity through enhanced growth, increased recruitment or migration of adults, it is also true that the more clement weather would facilitate fishing."

Stressing the need for caution in judging the past, present, and the future productivity of the Pacific and Atlantic cod, the authors consider that some coincidence between climate and yields should not be allowed to militate against a balanced understanding of the manifold forces affecting the fisheries.

On conditions in Faroe and Iceland they quote A. D. McIntyre, of the Scottish Home Department, who reported in 1952 on an extensive analysis of the Scottish trawl and line catches of halibut from various North Atlantic areas for the years 1830 to 1949.

"McIntyre observed that on the Faroe grounds the Scottish trawl catch per unit of effort had declined in 1942 and 1943 from the higher 1940 and 1941 level in spite of the relatively low wartime fishing intensity by Aberdeen vessels, and it was concluded that the higher 1940-1941 level could be projected back to good brood years of 1937 and 1938.

"The 1940-41 high trawl catch per unit of effort could also be projected forward to a higher Scottish liner catch per unit of effort in 1943 and 1944 from older fish of the same year-classes. A similar situation was observed on the Iceland grounds for Scottish vessels, except that the projection into the liner catch per unit of effort was not apparent until 1945-1946."

McIntyre, the report goes on, used only the fishing intensity and yields of the Aberdeen fleets in judging the effects of fishing upon the several stocks. "The Aberdeen fleet's Icelandic production varied from 4 to 45 percent of the annual total by all countries during the period of study, 1930-1949, not including the war years.

"The data presented by McIntyre should not be considered indicative of the total forces to which these stocks have been exposed. It would be the changes in the total amount of fishing and the combined catches by vessels of all nations to which the stocks would be responsive."

The authors conclude, on the available evidence, that the effects of man's removals on the stocks appear to transcend any long-term effects that natural fluctuations may have had. They add: "The hypothesis that fishing, not natural forces, has been the major factor affecting the stocks appears well founded." (*The Fishing News*, October 16, 1959.)

INTERNATIONAL PACIFIC SALMON COMMISSION

FRASER RIVER SOCKEYE
FISHERY, 1959:

The 1959 Fraser River sockeye catch of 3,390,000 fish was 46 percent greater than the catch in any previous cycle-year in 56 years, according to the International Pacific Salmon Fisheries Commission. Also the escapement of 970,000 fish was up almost 300 percent over that of the previous cycle-year in 1955 and considerably greater than that recorded previ-



International (Contd.):

ously for any other year of that four-year cycle.

The record Fraser sockeye run in 1959 was a continued demonstration that the Fraser River sockeye runs are rapidly being restored to the abundant numbers prevailing prior to the slide at Hell's Gate Canyon in 1913. The Hell's Gate fishways combined with scientifically-designed fishing regulations and a fundamental research program are now proving their worth in millions of dollars of increased income to Puget Sound and Fraser River fishermen.

In the 1958 cycle-year the Fraser River produced a total run of 19 million sockeye. This was the largest run on that cycle-year in the 85-year history of the commercial fishery and the largest run of any year since the famous run was almost destroyed by the Hell's Gate slide in 1913. By 1918 the cycle-year pack had declined to 70,000 cases, but in 1958 the cycle pack was 1,223,000 cases worth \$49 million, an increase of \$46 million in value as compared with 1918.

The International Pacific Salmon Fisheries Commission was established by a Convention between the United States and Canada in 1937 to rehabilitate the Fraser River sockeye fishery and to manage the fishery after eight years of research to the end that the fishery would be preserved and the allowable catch divided equally between Canadian and United States fishermen. In 1957 the Convention was amended to place Fraser River pink salmon under similar jurisdiction by the Commission.

MARINE OILS

INCREASE IN 1960 FORECAST FOR WORLD PRODUCTION AND EXPORTS:

World production of marine oils (includes whale and sperm whale oils and fish and fish-liver oils) will be up about 2.9 percent and world exports will be up about 6.2 percent in 1960 as compared to 1959. The U. S. Department of Agriculture's Agricultural Marketing Service in its November 1959 issue of The Fats and Oils Situation (1960 Outlook Issue)

forecasts that world production of marine oils will be 1,050,000 short tons as compared with 1,020,000 tons in 1959. The forecast for world exports of marine oils in 1960 is 775,000 tons as compared with 735,000 tons in 1959.

Marine Oils	1960 ²	1959 ³	1958	1957	1956	1955	Average 1935-39
							(1,000 Short Tons)
World production	1,050	1,020	1,030	1,025	1,110	1,060	990
World exports	775	730	760	730	745	725	694

¹ Includes whale and sperm whale oils and fish and fish-liver oils

² Forecast.

³ Early forecast.

MARINE RESOURCES SURVEY OF SOUTHEAST ASIAN AREA

The Scripps Institution of Oceanography (La Jolla, Calif.) research ship Stranger is now in the Southeast Asian area for a two-year survey of marine resources of the South China Sea and Gulf of Thailand. The work is supported by an International Cooperation Administration grant.

The survey work of the ship is planned in conjunction with a Regional Training Course in Marine Sciences at Nha-Trang, South Viet-Nam, sponsored by the Republic of Viet-Nam and the United Nations Educational, Scientific, and Cultural Organization Science Cooperation Office for South-East Asia. Practical experience will be offered to the participants in the course on board the Stranger.

NORTHWEST ATLANTIC FISHERIES COMMISSION

TENTH ANNUAL MEETING:

Following an invitation from Norway, the Tenth Annual Meeting of the International Commission for the Northwest Atlantic Fisheries will meet in Bergen the week of May 30, 1960. The Annual Meeting will be preceded by meetings of the Standing Committee on Research and Statistics and of groups of advisers to panels on May 24-28.



MORE COUNTRIES FISH IN NORTHWEST ATLANTIC:

To the countries which have begun fisheries in the Convention Area during re-

International (Contd.):

cent years is now to be added East Germany. Trawlers with Rostock on the Baltic as their home port in 1959 landed several cargoes, mainly redfish or ocean perch and cod, from the Labrador-Grand Bank area. It is expected that this fishery will increase in the near future.

Reports from Vigo, Spain, indicate that the Spanish trawl fishery in the Grand Bank area in 1959 yielded better results than in 1958.

In 1959 trawlers from Poland began fishing in the Northwest Atlantic (Labrador region) for redfish or ocean perch. The report from the fishery states that excellent results were obtained.

SOUTH PACIFIC COMMISSION
ON MARITIME RESOURCESSIXTH MEETING HELD IN QUITO:

The Sixth Ordinary Meeting of the Permanent Commission on Maritime Resources of the South Pacific and the Second Meeting of the Commission's Scientific Advisory Committee were held in Quito from November 12-19, 1959, with delegates from Chile, Peru, and Ecuador in attendance. Addressing the inaugural session of the Commission, Chile's Ambassador to Ecuador praised the progress attained in the scientific investigation of the fish and whale industries, "proving what can be done with international cooperation." "It is the hour for abandoning outdated conceptions of isolation and for entering an era of interdependence," the President of the Ecuadorian delegation added.

Reports of the three delegations indicated considerable cooperative study of the problems of exploitation and conservation of marine resources. Ecuador reported establishment of a library of scientific and technical publications for use of the Commission and establishment of a National Fisheries Institute. The Scientific Advisory Committee recommended the acquisition of a special laboratory vessel for the Commission's investigation of whales, and the preparation of a dictionary of scientific terms in the fishing industry. In the closing

session the Commission elected Dr. Galo Leoro Franco, of Ecuador's Foreign Ministry, as its permanent Secretary General.

Note: See Commercial Fisheries Review, October 1957, p. 23.

TUNA

SOUTHERN EUROPEAN COUNTRIES
BUILD NEW TUNA FISHING VESSELS:

Several southern European countries are building tuna vessels. In addition to six tuna clippers under construction in Genova, Italy, Portugal is also building six tuna vessels. At present Portugal is operating two large tuna vessels.

Both Italy and Portugal will fish for tuna in the Atlantic Ocean. France, too, is pushing construction plans for tuna vessels. At Dakar, French West Africa, about 9,000 tons of tuna were landed during the first quarter of 1959. Five Dakar packing plants used about half of the landings and the remainder was shipped to France. (Suisan Tsushin, November 19, 1959.)

UNITED NATIONS

SECOND CONFERENCE ON THE
LAW OF THE SEA TO OPEN
ON MARCH 17, 1960:

The Second United Nations Conference on the Law of the Sea will convene in Geneva, Switzerland, on March 17, 1960. It is hoped that the task of the Conference will be completed by April 14, 1960. Should it prove impossible for the Conference to finish its work within that four-week period, arrangements can be made to enable the Conference to continue through the following week, April 19-22, 1960.

Preparations for the Conference are being made by the United Nations Secretariat, which expects to circulate to the invited Governments, specialized agencies, and intergovernmental bodies a draft agenda and draft rules of procedure for the Conference, as well as certain recommendations concerning the method of work and procedures, and other questions of an administrative nature.

Attention is drawn to the terms of paragraph 3 of the resolution which invites all states members of the United

International (Contd.):

Nations and states members of the specialized agencies to include among their representatives experts competent in the matters to be considered.

Note: Also see Commercial Fisheries Review, February 1959, p. 49.

WHALING

COUNTRY QUOTAS FOR 1959/60
ANTARCTIC SEASON:

The Norwegian Government has approved a recommendation from the Norwegian Whaling Council that Norway's quota for the 1959/60 Antarctic whaling season shall be limited to 5,800 blue-whale units. (One blue whale equals 2 fin, $1\frac{1}{2}$ humpback, and 6 sei whales.) Altogether 8 Norwegian expeditions, one less than last season, are participating in Antarctic whaling. They are using a total of 77 catcher vessels as compared with 100 during 1958/59, including 7 vessels operating out of the Norwegian land station at Husvik Harbor. The factory-ship Suderøy and its 6 catcher vessels, which took part in last season's whaling, have been bought by the Norwegian Whaling Association and will not participate. Norwegian expeditions and the Husvik land station vessels will have a combined complement of 4,210 men, or 497 fewer than in the 1958/59 season. Another 1,975 Norwegian whalers will be working for British and Argentine companies.



Also engaged in the Antarctic whaling this coming season are expeditions from four other countries, including 6 Japanese, 3 British, 2 Russian, and 1 Dutch, plus two land stations--1 British and 1 Argentine, using a total of 158 catcher vessels. There will thus be altogether 20 expeditions, same as last season, assisted by 235 catcher vessels, as against 256 in 1958/59. While Norway has withdrawn the 11,000-ton Suderøy, the Soviet Union is sending its new 40,000-ton Sovetskaya Ukraina, accompanied by 20 catcher vessels.

At a conference in London nearly a year ago, the five major whaling nations

reached tentative agreement that the Soviet Union should be allocated 20 percent of the international quota for a period of 7 years. On the basis of a maximum catch equivalent to 15,000 blue-whale units, the Soviet Union should thus be entitled to 3,000-units. At subsequent conferences, Norway, Great Britain, Japan, and the Netherlands failed to work out agreement on distribution of the remaining 80 percent of the whaling quota. In view of this development, Norway withdrew from the International Whaling Convention as of July 1, 1959, and the Netherlands later followed suit. Thus, the International Whaling Convention now includes only three nations--Great Britain, Japan, and the Soviet Union.

Norway for many years has been a strong advocate of measures to preserve the Antarctic whale stock. When efforts for agreement failed the Norwegian Whaling Council urged a national quota of 5,800 units, to yield approximately the same catch as last season. The quota for the Japanese expeditions has officially been fixed at 5,036 units. The British quota, though not officially announced, is known to be 2,500 units. And the Dutch company operating the Willem Barends expedition plans to catch the equivalent of 1,200 units. If the Soviet expeditions stay within the approved 3,000 units, the combined national quotas would total 17,500 units. The over-all quota set by the 18-member International Whaling Commission for 1959/60 would thus be exceeded by at least 2,500 units.

Marine biologists are of the opinion that to preserve the Antarctic whale stock the maximum quota for all nations should be limited to 10,000-11,000 blue-whale units. Protection of the blue-whale stock, they maintain, is especially important. According to a statistical survey, published in the last issue of Norsk Hvalfangst-Tidende (Norwegian Whaling Journal), the number of blue whales caught in the Antarctic during 1958/59 constituted only 4.4 percent of the total catch, as against 84.2 percent during the 1931/32 season.

The International Whaling Commission in 1959 decided to let the Antarctic fin and sei whale hunt start on December 28, one week earlier than in former years. For blue and humpback whales the opening dates were set at February 1 and Jan-

International (Contd.):

uary 20, respectively. The entire season could thus last 102 days, extending to April 7, 1960. Land stations, whose vessels catch only sperm whales, are not covered by the quota arrangement. From October 1 to April 1 they can catch an unlimited quantity. (News of Norway, November 26, 1959.)

Note: Also see *Commercial Fisheries Review*, December 1959, p. 93 and January 1960, p. 80.

WORLD FISHERIES

LANDINGS INCREASED THREE MILLION TONS IN 1958:

The world's total commercial fisheries landings in 1958 increased 3 million metric tons over 1957, according to the *Yearbook of Fishery Statistics*, vol. IX, released by the Food and Agriculture Organization of the United Nations. Japan, with a catch of 5.5 million tons, continued to be the largest producer of marine fishery products.

The Yearbook, published jointly with a yearbook on statistics on international trade in fish, covers the catch of fish from 1953 to 1958. The total 1958 catch was 33.7 million tons live weight, almost 13 million tons more than in 1938 or 1948, just before and after World War II. Russia reported the highest catch in fish history, at 2.5 million tons. The 1958 total includes a rough estimate of six million tons for production of sea and fresh-water fish by Mainland China. This figure has been released by the Government of that country and represents a 100-percent increase over its reported catch in 1957.

Asia had 50 percent of the world's total catch. Japan contributed 17.2 percent of the Asian total. European fishermen, excluding those from Russia, caught more than 22 percent, and North Americans about 10 percent. The U.S.S.R. reported catches amounting to more than 8 percent of the world total. Africa contributed 5 percent, an outstanding increase over last year.

Seven countries each caught more than one million tons in 1958 and accounted for almost 60 percent of the world total. Japan's 1958 catch reached a level she had hoped to realize by 1960. The United States, Mainland China, and the U.S.S.R. each caught between 2 and 3 million tons of sea fish in 1958. Canada, Norway, the United Kingdom, and India each produced about one million tons. Korea, one of the great prewar producers with a catch of 1.8 million tons in 1938, produced less than 500,000 tons.

Herring, menhaden, sardines, and anchovies were the most important group of fish, accounting for 20 percent of the world catch. Sixteen percent were fresh-water fish, more than double the amount caught before World War II. Cod, hake, and haddock accounted for more than 13 percent of the total. In most groups catches were above prewar level. However, this still was not the case for salmon, trout, and smelt, which are commercially important though not a very large group in quantity. About one-half the 1958 total catch was marketed fresh or frozen; about one-quarter was cured by drying, smoking, salting, or marinating; about 14 percent was used to make fish meal and oil; 9 percent was canned; and the small remainder was used for other purposes.

TRADE IN 1957 EXCEEDED ONE BILLION DOLLARS:

International trade in fish in 1957 went over the US\$1 billion mark, according to the *FAO Yearbook of Fishery*

Statistics, vol. VIII. The Yearbook, published jointly with a volume on the actual landings of fish, is the first on international trade (fish exports and imports) published since 1953. It covers the years 1953-57, with 1948 given as comparison.

Trade is broken down into frozen, dried and salted fish, smoked and canned fish products, and fish oils and meals. There was a sharp upswing in the fish-meal industry. Exports of fish meal, which is used primarily for animal feeding, have increased from \$13 million in 1948 to \$80 million in 1957. Major exporters of fish meal, who have taken the lead due to the expansion of the fish-meal industry in their countries, are Angola, the Union of South Africa and South-West Africa, Canada, Peru, Denmark, and Norway.

Major markets for fish meal include the United States, whose imports increased from \$4.6 million in 1948 to \$9.5 million in 1957, and the United Kingdom whose imports went from \$3 million in 1948 to \$24 million in 1957. Western Germany increased her imports of fish meal from \$300,000 in 1948 to \$20 million in 1957.

Exports of fresh and frozen fish went up 150,000 metric tons from 1953 through 1956. The greater position of this trade was in filleted fish rather than whole fish, reflecting the growth of the frozen fish fillet industry. In dollars, it increased by nearly 50 percent, from \$170 million to \$232 million. In Africa leading exporters of fish were Angola with a \$17 million trade, Morocco with \$26 million, and the Union of South Africa with \$37 million. Canada led North America with a \$136 million export volume. The United States exported only \$32 million, but imported \$270 million worth of fish—one quarter of the world total.

In South America, Peru did a \$20-million export business. Asia was led by Japan with an export of \$145 million. Thailand was second with \$33 million. Norway topped European fish exporters with \$164 million worth, followed by Iceland with \$55 million, Denmark with \$43 million, the Netherlands with \$32 million, and Portugal with \$37 million.

Salted cod exports and production have both expanded by 40 percent since 1948. Leading exporters were Canada, Denmark, France, Iceland, and Norway. Chief importers of dried cod were Cuba, Jamaica, Puerto Rico, Brazil, Greece, Italy, Portugal, and Spain.

Although production had been maintained in salted herring and sardines, there was a 20-percent drop in exports since 1948. Eastern Europe was the major importer of salted herring and sardines. Chief exporters are Canada, Iceland, the Netherlands, Norway, Sweden, and the United Kingdom.

The canned fish industry exported \$265 million worth. Of that total, 20 percent was Pacific salmon; 40 percent canned herring, sardines, and anchovies; 20 percent tuna and bonito; 10 percent shrimp, lobsters, and oysters; and 10 percent miscellaneous products.



Argentina

JAPANESE FREEZERSHIP TO OPERATE FROM ARGENTINE PORT:

The Japanese tuna freezer-fishing vessel *Yoshino Maru* arrived at the Argentine port of Mar del Plata on November 16, 1959, with 150 metric tons of tuna. The vessel left Japan on August 26 and fished for tuna en route to Argentina. After leaving Japan, the vessel fished in the Pacific along the equator and caught 70 tons of yellowfin, bluefin, albacore, and big-eyed tuna.

Heretofore it was believed that there were no tuna off the Argentine coast, but

Argentina (Contd.):

the vessel found them 300-500 miles offshore in the Atlantic. The modern Japanese flag vessel is 180 feet long, has a beam of 29.5 feet, and is powered with a heavy-duty 1,150-hp. Diesel engine. The hold capacity is about 440 metric tons of frozen fish and freezing capacity is 17 tons daily. Equipped with all modern navigation aids, the vessel can cruise at 11.5 knots. She is manned by 8 officers and a crew of 50.

The Japanese vessel is under contract to a Mar del Plata fishing firm which plans to use the vessel to obtain frozen fish for the Argentine market. Following the unloading of the tuna caught en route to Argentina, the vessel was scheduled to sail early in December for its first trip from Argentina of about 50 days.

The Yoshino Maru is the second Japanese vessel fishing under contract to the Argentine fishing industry. The first vessel, the Eisei Maru (landed first trip December 17, 1958), has been tuna fishing for about one year for the Mar del Plata Fishing Canning Association. Due to the lack of credit facilities, it would be difficult for the Argentine fishing industry to build and finance vessels of the Japanese type. (The United States Embassy in Buenos Aires, November 17, 1959.)

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LANDINGS OF FISH AND SHELLFISH:

Marine landings of fish and shellfish in Argentina amounted to 71,655 metric tons in 1958, just 69 tons less than the 71,724.3 tons reported in 1957.

The principal marine species of fish caught in Argentina during 1958 and 1957

Table 1 - Argentine Marine Landings of Fish and Shellfish by Fishery Zones, January-March 1958-59 and Annual Totals 1957-58				
Zone	January-March		12 Months	12 Months
	1959	1958	1958	1957
.....(Metric Tons).....				
Fish:				
High seas	7,973.6	5,485.8	25,185.6	25,248.6
Coastal Zones:				
Bahia Blanca	307.6	299.3	1,504.6	1,338.3
Quequen, Necochea	1,189.0	1,657.2	3,665.5	4,616.6
Mar del Plata	7,841.8	11,954.9	36,699.5	34,814.4
Rawson	60.0	200.2	235.9	254.5
San Antonio Oeste	14.2	6.8	59.1	89.0
San Blas, Patagonia	48.6	11.3	42.3	78.3
Tres Arroyos	0.5	-	36.5	187.1
Ushuaia	0.1	-	1.6	-
All other zones ^{1/}	49.6	50.9	130.6	93.5
Total Fish	17,485.0	19,666.4	67,561.2	66,720.3
Shellfish:				
High seas	156.3	205.2	421.4	388.6
Coastal Zones:				
Bahia Blanca	140.7	131.6	459.3	386.8
Quequen, Necochea	625.6	348.9	1,724.3	2,811.3
Mar del Plata	49.5	50.3	468.9	149.9
Rawson	17.0	118.9	765.6	1,015.0
San Antonio Oeste	121.5	118.6	179.8	190.1
San Blas, Patagonia	-	-	1.0	-
Tres Arroyos	-	-	-	-
Ushuaia	0.3	3.3	58.0	52.8
All other zones ^{1/}	3.4	1.3	15.5	9.5
Total Shellfish	1,114.3	978.1	4,093.8	5,004.0
Grand Total	18,599.3	20,644.5	71,655.0	71,724.3
^{1/} Includes Comodoro Rivadavia, Gral. Madariaga, Puerto Madryn, Puerto Deseado, Rio Gallegos, Rio Grande, San Julian, and Santa Cruz.				
Source: Direccion General de Pesca y Conservacion de la Fauna, Argentine Government.				

Argentina (Contd.):

were hake--27,822 and 25,529 metric tons, respectively. Mackerel and an-

ary-March 1959 with a decrease of 2,970 tons as compared with the same period in 1958.

Table 2 - Argentine Marine Landings of Fish and Shellfish by Species, January-March 1958-59 and Annual Totals 1957-58

Species	January-March		12 Months	12 Months
	1959	1958	1958	1957
.....(Metric Tons).....				
Fish:				
Anchovy	0.5	8.0	10,186.7	8,817.2
Sea bream (besugo)	556.4	473.2	1,649.8	1,004.4
Mackerel and mackerel-like ^{1/}	6,736.5	11,229.3	16,027.7	21,240.2
Conger eel (corvina)	554.8	439.7	1,261.4	873.4
Hake (<i>Merluccius hubbsi</i>)	7,639.3	5,641.2	27,822.0	25,529.4
Shark	208.1	252.5	3,967.4	3,642.9
Other fish	1,789.2	1,622.4	6,646.3	5,612.7
Total Fish	17,484.8	19,666.3	67,561.3	66,720.2
Shellfish:				
Shrimp, small	25.3	39.1	260.6	236.5
Shrimp, large ("langostinos") .	141.8	236.9	1,084.3	1,338.3
Mussels	656.0	380.5	2,044.2	2,827.3
Other shellfish	291.4	321.6	704.6	602.0
Total Shellfish	1,114.5	978.1	4,093.7	5,004.1
Total Fish and Shellfish	18,599.3	20,644.4	71,655.0	71,724.3

^{1/}Includes caballa, coralito, and pejerrey.

Source: Direccion General de Pesca y Conservacion de la Fauna, Argentine Government.

Table 3 - Argentine Marine and Fresh-Water Fishery Landings, January-March 1958-59 and Annual Totals 1957-58

Type of Fishery	January-March		12 Months	12 Months
	1959	1958	1958	1957
.....(Metric Tons).....				
Marine fish and shellfish	18,599.3	20,644.4	71,655.0	71,724.3
River and lake fish:				
Food	3,426.1	3,759.5	8,593.6	8,962.4
Industrial use ^{1/}	2,361.6	2,953.5	4,662.2	5,038.6
Total River and Lake Fish .	5,787.7	6,713.0	13,255.8	14,001.0
Total Marine and Fresh-Water	24,387.0	27,357.4	84,910.8	85,725.3

^{1/}Consists of "sabalo" (*Prochilodus platensis*), related to shad.

Source: Direccion General de Pesca y Conservacion de la Fauna, Argentine Government.

chovy were the other important species. The leading shellfish products were mussels and shrimp.

During January-March 1959, shellfish production increased as compared with the same period in 1958. But total marine fish production decreased 2,182 metric tons, or 12.5 percent, during the first three months of 1959.

Argentina's total marine and freshwater fishery landings in 1958 decreased slightly as compared with 1957. The downward trend continued during Janu-

--By Ing. Daniel O. Alvaredo,
Temperly, F.C.G.R., Argentina

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MACKEREL AND ANCHOVY LANDINGS AT MAR DEL PLATA:

The port of Mar del Plata is the most importance fishery port in Argentina. Two of the important species landed at that port--mackerel and anchovy-- show considerable fluctuation in landings from season to season. (See tables 1 and 2.)

Argentina (Contd.):

Table 1 - Mackere! Landings at Port of Mar Del Plata						
Month	1958/59	1957/58	1956/57	1955/56	1954/55	1953/54
	(Metric Tons)					
December	768	-	2,461	-	1,403	535
January	1,850	3,169	4,467	1,242	3,994	2,885
February	1,661	2,828	2,216	2,274	3,346	3,246
March	1,661	3,038	5,085	1,779	2,797	3,241
April	-	1,593	749	-	1,982	1,251
May	-	89	3,508	-	277	436
Total	5,940	10,717	18,436	5,295	13,809	11,594

Table 2 - Anchovy Landings at Port of Mar Del Plata					
Month	1958	1957	1956	1955	1954
	(Metric Tons)				
August	-	-	249	247	274
September	1,925	1,922	3,257	2,087	4,774
October	5,905	4,948	4,903	6,897	1,804
November	1,449	562	606	2,765	1,855
Total	9,279	7,432	9,015	11,994	8,707

--By Ing. Daniel O. Alvaredo,
Temperley, F.C.G.R., Argentina

SHRIMP INDUSTRY TRENDS:

Landings: Since 1956 there has been a steady drop in shrimp landings in Argentina. Landings in the first two months of 1959 were only half the amount landed during the first two months of 1958.

Table 1 - Argentina's Shrimp Landings, 1956-58 and January-February 1958-59					
	January-February				
	1959	1958	1958	1957	1956
	(1,000 Lbs.)				
Shrimp, large	209	423	2,390	2,950	4,266
Shrimp, small	40	81	575	521	1,171
Total	249	504	2,965	3,471	5,437

Exports: Shrimp exports to the United States began in 1952 with 5,000 pounds, rose to 227,000 pounds in 1953, and to 530,000 pounds in 1954. A price break in the United States market in 1953-54 and some quality problems resulted in no shipments to the United States in 1955. Exports were resumed in 1956, when 22,000 pounds were exported to the United States, followed by exports of 320,000 pounds in 1957, 914,000 pounds in 1958, and 419,000 pounds during the first six months of 1959. (See table 2.)

Fleet: Argentina has about 25 vessels active in the shrimp fishery as of November 1959. These vessels are about 66 feet in over-all length and are powered with 6-cylinder 160-hp. Diesel engines. According to reports, there are no immediate plans for the expansion of the fleet in the near future.

Ex-Vessel and Export Prices: In November 1959 Argentine shrimp vessels were paid about 25 pesos a kilogram (about 14.2 U. S. cents a pound) for heads-on shrimp counting between 15 and 30 to the pound, the only sizes exported by Argentina. Ex-vessel prices for medium shrimp (31-50 count) were 12 pesos a kilogram (about 6.8 U. S. cents a pound) and for small shrimp (over 50 count) 8 pesos a kilogram (about 4.5 U. S. cents a pound).

The price of processed headless shrimp (15-30 per pound size) for export

Table 2 - Argentina's Shrimp Exports, 1956-58 and January-June 1959				
Country of Destination	Quantity			
	Jan.-June 1959	1958	1957	1956
	(1,000 Lbs.)			
United States	419	914	320	22
Uruguay	-	16	100	77
Paraguay	-	3	12	1
United Kingdom	-	-	107	-
Total	419	933	539	100
	Value			
	(\$1,000)			
United States	104	354	159	6
Uruguay	-	1	16	7
Paraguay	-	1/	2	1/
United Kingdom	-	-	14	-
Total	104	355	191	13

1/ Less than \$500.

Note: Export data for 1952-1955 are from United States import statistics; for 1956-1959 from Argentine official export statistics.

Argentina (Contd.):

loaded aboard reefer ships at Buenos Aires was about 55 U. S. cents a pound, which includes all costs except the profit to the exporter. Actual export prices in November 1959 averaged about 60 U. S. cents a pound for large shrimp. Export taxes amount to 10.5 percent, levied on the exporter's gross proceeds.

Since the shrimp prices dropped in the United States market, the export trade is not very attractive to Argentine exporters because of the low margin of profit for the processor-exporter. (United States Embassy in Buenos Aires, November 18, 1959.)



Australia

SPINY LOBSTER INDUSTRY,
FISCAL YEAR 1958/59:

Exports: Australian exports of both frozen tails and of boiled whole spiny lobsters—7,673,199 pounds—set a new record in fiscal year 1958/59 (July 1958-June 1959) for both quantity and value. Spiny lobster tail exports in 1958/59 of 7,092,217 pounds were 22 percent more than in 1957/58. Almost all of the tails were exported to the United States and other dollar areas.

Dollar earnings from frozen tail exports in 1958/59 were estimated at US\$5.9 million as compared with \$5.9 million the previous fiscal year—up 17 percent.

Although prices dropped on the United States market, good prices were received for most consignments in 1958/59. Western Australian consignments accounted for 82 percent of total shipments.

State	1958/59		1957/58	
	Tails	Whole	Tails	Whole
	(1,000 Lbs.)			
United States	6,842	477	5,626	641
Hawaii	216	-	158	-
Singapore	11	86	12	67
Canada	13	2	10	33
United Kingdom	-	6	-	-
New Guinea/				
Pacific Islands	1	5	1	6
Persian Gulf	8	-	8	-
Other	1	5	-	4
Total	7,092	581	5,815	751

In the absence of more precise information as to the value of exports from other States, the average for Western Australia, as in past years, has been applied to all shipments. However, as lots of South Australian tails normally bring higher prices, this average price may be too low. Probably final figures will show that export earnings will exceed seven million dollars.

In Western Australia, midget and small tails accounted for approximately 57 percent of total State exports in 1958/59. For the year 1957/58, midgeta represented 28 percent of total exports from Western Australia, whereas they constituted 29.4 percent of all 1958/59 exports from that State. At the same time the quantity of smalls exported has fallen from 30 percent to 28 percent. There has also been a decline from 22 percent to 19.3 percent in the quantity of medium tails exported from Western Australia. This size of tail brings the highest prices on the United States market.

In South Australia, small and midget tails together accounted for 25 percent of total tail exports and medium accounted for a similar amount. The other two sizes, large and jumbo, totaled 23 percent in Western Australia and 50 percent in South Australia.

This difference in percentages of sizes exported from those two States is, to a large extent, a result of the difference in size of the two species of spiny lobsters exploited in those States. The southern crayfish (*Jasus lalandi*), which is obtained in South Australia, Victoria, and Tasmania, is in general a larger spiny lobster than the Western Australian spiny lobster (*Panulirus longipes*) which constitutes the major portion of the Western Australia catch.

Table 2 - Australian Exports of Spiny Lobsters by States, 1956/57-1958/59

State	1958/59		1957/58		1956/57	
	Tails	Whole	Tails	Whole	Tails	Whole
	(1,000 Lbs.)					
Tasmania	185	110	118	93	224	73
South Australia	1,109	266	1,092	92	1,032	182
Western Australia	5,798	205	4,605	566	3,779	73
Total	7,092	581	5,815	751	5,035	328

Size details from States other than South and Western Australia are not yet available.

Production: Australian spiny lobster production increased substantially in the main fishing grounds in Western Australia, Victoria and Tasmania together also showed an increase over the preceding year of approximately 700,000 pounds. In South Australia and New South Wales, production fell. However, total Australian production exceeded the previous year's total by nearly 4.5 million pounds.

In all spiny lobster fishing areas the increase in the number of men and vessels in the fisheries, together with generally good weather, resulted in higher production. Owing to this increase in the competition for spiny lobster, the fishermen have been forced to fish over a large area; in many cases they are now fishing out to the 60-fathom line; and at the same time operating a larger number of pots than several years ago.

The South Australian Director of Fisheries attributed that State's lower production to bad weather.

Table 3 - Australian Spiny Lobster Production, 1952/53-1958/59

Fiscal Year	New So. Wales	Victoria	Tasmania	Australia		Total
				South	Western	
	(1,000 Lbs. Live Weight)					
1958/59	471	749	3,045	4,000	17,516	25,781
1957/58	523	635	2,406	4,460	13,327	21,345
1956/57	473	689	2,579	4,385	10,763	18,889
1955/56	438	614	2,802	4,000	10,530	18,384
1954/55	510	832	3,256	4,294	10,906	19,798
1953/54	576	1,163	2,527	3,850	9,224	17,340
1952/53	543	831	2,770	3,500	8,100	15,744

Australia (Contd.):

The New South Wales Superintendent of Fisheries advised that the drop in production of 54,000 pounds was due to changeable conditions in inland waters during the fishing season.

The Western Australia Director of Fisheries reported that, although a greater number of men and boats operated, excellent weather conditions in all areas, which permitted the fishing fleet to work consistently throughout the season, were mainly responsible for the large increase in production.

The Victorian Director of Fisheries said the marked increase over the previous year was due mainly to good weather from January to June 1959.

The Tasmanian Secretary for Fisheries reported that good weather, and an active demand for live spiny lobsters in both Sydney and Melbourne, intensified the activities of fishermen both in old established areas and the new areas on the North West and Central West Coasts.

The production data in table 3 are subject to revision. There seems little doubt, on the basis of quantity of tails exported, that the data are underestimated and that 1958/59 production may exceed 26 million pounds live weight (Australian Fisheries Newsletter, October 1959).

* * * * *

TWO VESSELS PLAN TO EXPORT TUNA CATCHES TO UNITED STATES:

Australia's two leading tuna vessels, Fairtuna and Tacoma, which fish from Port Lincoln, South Australia, are in New South Wales for the earlier tuna season there. The respective owners of the vessels intend to export their tuna catch, frozen whole, to the United States west coast. Export is being handled for them on a management/cost basis. Pending export from Sydney, the fish will be held in freezers there.

After the New South Wales tuna season, Fairtuna and Tacoma will return to Port Lincoln to fish.

Australia's tuna canneries in New South Wales had received 157 tons of the season's tuna to mid-September 1959, then bad weather spoiled fishing. A new tuna clipper, Estelle Star, is almost ready for fishing.

On September 15, a vessel about 300 tons, flying the Chinese Nationalist flag, was seen apparently long-lining tuna about 10 miles inside Rolley Shoals, 180 miles west of Broome, Western Australia. (Australian Fisheries Newsletter, October 1959.)

* * * * *

USE OF AIRPLANES FOR FISH SPOTTING INCREASING:

There are now four planes regularly employed in Australia spotting fish.

Fishermen of Lakes Entrance, Victoria, took delivery at the end of August 1959 of a £5,000 (US\$11,300) Piper Super Cub aircraft imported from the United States. They bought the plane primarily for Australian salmon (Arripis trutta) fishing. When a worthwhile school is sighted, the plane calls the fishing boats by radio.

A fishery firm and canner of Sydney was the pioneer of commercial fish spotting by plane in Australia, and still regularly employs the Piper Cub aircraft which came to Australia on the Fijian tuna clipper Senibua in 1950. The plane pilot is paid a retainer and a bonus based on the amount of fish landed.

At Lakes Entrance, an Auster plane is owned and operated by an owner of a salmon boat.

In Western Australia, an Auster plane, owned privately by a cannery operator, is also used by him to spot "salmon" schools for fishermen who supply his canneries.

A whaling company of Albany uses a chartered plane, as required, to spot whales.

The pioneer of whale spotting by plane in Australia was the company that operated the station at Point Cloates. Since they took over the former Australian Whaling Commission station at Carnarvon and concentrated all their whaling from that port, they have not used aircraft, but they have an arrangement with an airline that when it next has a helicopter available, it will be used for experimental spotting of whales. (Australian Fisheries Newsletter, October 1959.)



British East Africa

LAKE VICTORIA FISHERIES SERVICE UNDER HIGH COMMISSION TO END:

The Central Legislative Assembly of the East Africa High Commission voted on September 8, 1959, to hand over the responsibilities and assets of the Lake Victoria Fisheries Service to the individual territories--Kenya, Uganda, and Tanganyika.

generally speaking with inland waters some regulations to bind the common users were necessary if the fisheries were to survive, and that "this is the first retreat from common sense on the basis of interterritorial cooperation."

Officers of the Lake Victoria Fisheries Service will, in most cases, be transferred to the various territorial governments. Assets will be taken over by the



Lake Victoria, Kenya. A floating screen about 200 feet long constructed from papyrus rushes is poled out into the lake a short distance from shore. Two ends are drawn together forming a trap out of which surface-swimming fish cannot escape.

The date for winding up the Fisheries Service is upon repeal of the Act establishing the Service, but no later than June 30, 1960. The decision was based on practical considerations, according to the Administrator of the East Africa High Commission, who said that treating the fisheries on a territorial basis would be preferable on account of the different requirements of the individual governments. The Economic Secretary of the High Commission, who moved the motion to split up the fisheries service, stated that the Lake Victoria Fishing Board had some time ago reached the conclusion that in terms of dealing with its fisheries, Lake Victoria represented a number of lakes within a lake.

Both the Kenya Minister for Finance and Development and the Kenya Minister for Commerce and Industry described the measure as a "retrograde step." The Minister for Commerce and Industry stated that history had shown that

territorial governments where required for continuation of specific functions; other assets will be sold and the money raised used in conjunction with Colonial Development and Welfare funds for projects at the East African Fishery Research Organization (a High Commission function) at Jinja, Uganda. (United States Consul in Nairobi, September 11, 1959.)



Canada

BRITISH COLUMBIA CANNED SALMON PACK LOWER IN 1959:

The 1959 canned salmon pack by British Columbia canneries of 1,089,799 cases (48 1-lb. cans) was down sharply from the near-record of 1,900,025 cases (revised) packed in 1958. Although the 1959 pack was much lower than that for 1958 and the 1955 pink and sockeye cycle year, it was considered to be fair by the

Canada (Contd.):



A Canadian purse seiner, one of the more important types of British Columbia fishing vessels, sailing out to seek the schools of salmon.

Table 1 - Pack of British Columbia Canned Salmon, 1954-59

Species	1959	1958 ¹ /	1957	1956	1955	1954
	(Standard Cases--48-1-Lb. Cans).....					
Sockeye (red) ..	256,420	1,074,305	228,452	320,096	244,821	680,718
Spring (king) ..	15,760	10,550	10,481	11,671	17,853	14,080
Steelhead	1,254	1,205	1,126	1,254	1,590	3,733
Blueback	10,134	11,103	12,147	10,549	10,544	4,302
Coho (silver) ..	214,029	120,424	180,911	207,366	175,179	123,778
Pink	458,229	451,802	751,608	363,633	831,253	335,550
Chum (keta) ..	133,973	230,636	239,539	203,710	124,860	580,575
Total	1,089,799	1,900,025	1,424,264	1,118,279	1,406,100	1,742,736

¹/Revised.

biologists concerned with the conservation of the salmon of the Fraser River system. Price disputes between the salmon fishermen and canners early in the 1959 season curtailed the catch of sockeye salmon and resulted in a loss of about 200,000 cases.

Note: Also see Commercial Fisheries Review, March 1959, p. 61.

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BRITISH COLUMBIA EX-VESSEL AND CANNED SOCKEYE SALMON PRICES UP SHARPLY:

From 1950 to 1959 ex-vessel prices paid to British Columbia fishermen have increased 55.0 percent and during the same period the export price of canned

sockeye salmon has advanced 45.8 percent, according to the Fisheries Association of British Columbia.

British Columbia Sockeye Salmon Ex-Vessel and Export Prices		
Year	Ex-Vessel or Fishermen's Price (Canadian \$/lb.)	Export Selling Price (C\$/48-lb. Case)
1960	32	-
1959	31	40-46
1958	30	37-40
1957	28	40-38
1956	26	40
1955	24	35-38
1954	22	30-33
1953	22	30
1952	25	30
1951	25	34
1950	20	28-31

* * * *

Canada (Contd.):

**WEST COAST SALMON
INDUSTRY TRENDS, 1959:**

The dominant features of the 1959 Canadian west coast salmon fishing season were: a two-week strike which tied up the fishing industry during the latter part of July and the first part of August; an unusually high catch of Fraser River sockeye salmon for an off-season year; and the high price for canned salmon resulting from short supply and the increased price for raw fish. Another significant feature was the fact that less than ten percent of the salmon migrated through Johnstone Straits as compared with a much larger percentage in 1958.

The 1959 Canadian salmon pack, measured in 48-pound cases, was about 1.1 million cases. Of this amount, 253,000 cases were sockeye--the most valuable species. Authorities believe that had the two-week strike not taken place, the pack would have been about 200,000 cases more.

On the other hand, the price for salmon has reached an all-time high in the export market. Canners as of mid-October 1959 reported prices of C\$46 a case (48-pounds) for sockeye salmon. This has resulted in some protests from British purchasers who last year were paying \$37 to \$40 for the same product. Canners attribute this year's high price to the increased prices they must pay fishermen for salmon (31¢ a pound for sockeye) and to the small catch, which resulted from (a) a two-week strike during the middle of the season; and (b) an off-cycle year for salmon.

A large percentage of the British Columbia salmon pack is exported. In 1958, 1.5 million cases of the nearly 2-million-case pack were exported. The United Kingdom is traditionally the best market for the West Coast salmon pack. In 1958 the Netherlands took much more than usual because of the then low price.

In 1958 a large proportion of salmon came through Johnstone Straits (Canada) destined for the Fraser River, which permitted Canadian fishermen to catch them in that area without the necessity of dividing the catch with the United States fishermen under the terms of the Canada-United States North Pacific Salmon Convention. On the basis of scale analysis of samplings of the catch which show racial origin, less than ten percent of the sockeye took this unusual migratory diversion in 1959. Local authorities believe that the cause of the unusual migratory diversion last year was the fact that the Japanese Current struck the west coast of Vancouver Island at a point north of its usual course, causing salmon to mill about the northern end of Vancouver Island rather than about the southern end. Authorities state that in 1959 this unusual ocean condition did not exist and that therefore the salmon followed a more usual migratory pattern.

Failure of the packers and the Union to reach agreement on the price of raw fish resulted in the complete paralysis of the fishing industry for two weeks from July 25 to August 9--the peak period of the fishing season. Most estimates agree that C\$4 million were lost as a result of the strike.

The two-year contract which ended the strike provided the following prices for raw fish:

Salmon Species	1960	1959	1958 ¹
.. (Canadian Cents a Pound) ..			
Sockeye	32	31	28
Pink	11	10 $\frac{1}{2}$	9 $\frac{1}{2}$
Coho, steelhead, red spring, blueback, ...	22	21	16

¹/Old contract.

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**SALMON CATCH BY SPORTS
FISHERMEN IN BRITISH
COLUMBIA INCREASING:**

An increasing number of sports fishermen are fishing British Columbia waters, principally for silver (coho) and

king (spring) salmon. British Columbia is pushing its tourist industry and salmon fishing is one of the local attractions. For example, sports fishermen accounted for 204,550 salmon in 1953, as compared with 408,900 salmon in 1958. The increasing pressure placed on the fishery by sports fishermen has made it necessary for the Canadian Department of Fisheries to maintain special records on the sport catch effort. This is accomplished by sending questionnaires to sports fishermen as well as by checking with various fishing stations which rent boats to sports fishermen.

There has also been a notable increase in the number of small boats suitable for salmon fishing purchased within the last two years by British Columbia residents. Moreover, many United States tourists bring their own boats to British Columbia, either by trailer or by water.

As a result of the increased pressure on the fishery, the Canadian Department of Fisheries is gathering and assessing information to assist in evaluating conservation and management needs to ensure that the present salmon stocks are utilized and protected to a safe, sustainable productivity level.

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BRITISH COLUMBIA WHALING IN 1959:

The whaling company operating out of Winter Harbor Station, Vancouver Island, British Columbia, landed a record number of whales during the April-September 1959 season. But the total tonnage was below that for 1958 due to the relatively large number of small whales caught. The 1959 catch by the company's six catchers of 869 whales consisted of 369 finback, 185 sei, 260 sperm, 28 blue, and 27 humpback whales. The catch of blue whales, which are among the largest and are the most valuable, exceeded expectations. The catch of whales in 1958 was 774 and in 1957 it was 635 whales.

The depressed world market for whale oil reduced the net profit from the 1959 operations to about the break-even level, the United States Consul in Vancouver reported in October 16, 1959. (See photograph on the following page.)

Canada (Contd.):



A swirl of smoke clouds the harpoon as the gunner fires the harpoon at the humpback whale off the port bow of a Canadian whale catcher. When whale is captured, air is pumped into the carcass to keep it afloat. It is marked with flagged and lighted buoys to be picked up later and towed to the factory.

* * * * *

**CHAMBER OF COMMERCE
POLICY DECLARATIONS
INCLUDE COMMERCIAL FISHERIES:**

Policy declarations of the Canadian Chamber of Commerce for 1959-60 included the following: "Commercial Fisheries: Fisheries are a basic industry of Canada that provide a livelihood for a large number of people, both directly and through secondary industry. The Chamber emphasizes the need for support of policies for the protection, conservation, and development of the fishery resources of our inland and coastal waters. Such policies require adequate

recognition of pollution problems and adequate safeguards in relation to forestry and water-power developments. The importance of protecting Canada's offshore fishing interests is emphasized.

"Water: To encourage the maximum utilization of our water resources, Government should continue to prosecute with vigour all hydrometric surveys, should carefully appraise the needs of fishing, irrigation, navigation, and other interests concerned. Special attention should be devoted to pollution problems, solutions for which are becoming increasingly urgent. The Chamber believes in

Canada (Contd.):

the development of a program for the establishment of a national policy for the control, conservation, and development of water resources for multiple purposes on which all interests can unite and on which a maximum of local and provincial autonomy is assured."

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FISHERIES RECOMMENDATIONS INCLUDED IN REPORT OF ROYAL COMMISSION ON PRICE SPREADS:

Recommendations for improvement of Canadian fisheries are included in a report released on December 3, 1959, by the Royal Commission on Price Spreads appointed by Parliament in December 1957.

The seven-man Commission was appointed to study the extent and the causes of the spread between prices received by producers of food products of agricultural and fisheries origin and the prices paid by consumers for those food products.

The investigation was the natural outcome of two conditions prevalent in 1957. At the time prices for fisheries and farm commodities had been falling for a number of years with a resulting decrease in the farmers' and fishermen's share of the national income.

The Commission's report lists among the causes for increased prices to consumers, higher freight rates, labor costs, promotional activities, and rising real estate costs. On the other hand the Commission reports as causes for declining prices to commodity producers the following: overproduction, reduced per capita consumption, inefficient marketing, and lack of quality products.

Specific recommendations covering fisheries were as follows: a Federal Fish Marketing Act to pave the way for fish marketing arrangements similar to compulsory agricultural marketing boards; establishment of a fish grading system and grade definitions for products processed and sold by fishermen; and improvement of

statistical information available through the services of the Bureau of Statistics with regard to Newfoundland fisheries, catch and prices for fish and fish products, flow of total gross and net incomes from fishing, and incomes of fishermen including earnings from all other occupations.

* * * * *

FISH FLOUR DEVELOPMENTS:

The Canadian Fisheries Research Board of Canada's technological station at Halifax has closed one chapter in its development of fish flour, but has announced a new fish flour project that promises even greater potential than the original research experiment—exploring the abundant stocks of herring and alewives as the raw material for a new type of fish flour.

The original project with cod and haddock was a success. Not only has the fish flour produced from cod and haddock fillet waste at the Halifax station proven to be of good quality, but it has another quality that was heretofore missing. The latter factor evolving from the last stage of the experiment involved a special treatment of the product that makes it easily mixed in liquids such as milk or water. One of the problems had been the difficulty in suspending fish flour in liquid, but the new treatment has corrected that. There is now more uniform suspension and the fish product becomes as easily suspended in milk or water as does ordinary flour.

Capping off the fish flour experiment was the recent work which indicated that the product, which is roughly 90 percent protein, has a nutritive value equivalent to egg albumen, which is the standard used in nutritional assays.

The station's venture into the herring-alewife field as a source of fish flour has met with good results so far. While it is true that herring fish flour is not as white (it is slightly grayish) as the product made from cod and haddock, it is, for all practical purposes, tasteless and odorless.

Experiments so far also indicate excellent fish flour can be produced from alewives. Work is being carried on to measure the nutritional value of the new products. Analyses of the amino acid content of the new flours will be followed by nutritional assays made on rats.

Development of fish flour was a postwar project sponsored by the Food and Agriculture Organization of the United Nations. It was undertaken by many of the world's leading fishery research laboratories, including the station at Halifax. The program was prompted by a desire to supply underprivileged nations with a cheap supply of animal protein. There was another reason too for emphasis on the work in countries in the Western Hemisphere. For instance, dietetic studies showed that in Canada and the United States there was need for additional proteins in some diet formulations, especially for people engaged in heavy manual work, post-operative patients, and elderly people. One of the simplest uses of the product has been as an additive to bread and cereals.

Raw material for fish flour made from cod and haddock is the trimmings from fish filleting (but not the heads). In the case of herring and alewives the whole fish is used. From the latter species byproducts other than fish flour are also being developed.

Abundance of herring and alewives on the east coast of Canada gives the current experiment an added attraction. That is the economic feature which, in all probability, would make production of the flour cheaper than the "white fish" flour. (Canadian Trade News, October 1959.)

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Canada (Contd.):

SWORDFISH VESSEL TRIES NEW ELECTRONIC HARPOON:

A new electronic harpoon, which is a modified version of one originally developed by a West German fisheries scientist, was demonstrated aboard the swordfish vessel Terry and Gail off the Nova Scotia coast in the summer of 1959.

Using the new harpoon showed that in 11 hours of fishing at the height of the season, 13 swordfish were sighted, 13 were killed, and 11 were landed. The two escapes were said to be the result of faulty barbs.

The modified version of the electronic harpoon which has been developed by the research staff of a United States company uses a 250-volt charge which is carried by cable (replacing the former rope) to the harpoon head. The shock instantly kills the swordfish which means that it can be landed in a matter of a few minutes as compared with the average of 30 minutes to 3 hours using the old technique. It is also reported that killing by shock leaves the meat of the swordfish in better condition than if caught after a wild struggle.



Ceylon

SHRIMP FISHERY:

The catch of shrimp in Ceylon is estimated to be about 0.5 million pounds annually. Small shrimp are available in local markets, but the catch is not considered important enough by Ceylon's Department of Fisheries to show it separately in official statistics.

The small catch of shrimp is taken in lagoons or near shore with cast nets by wading fishermen. Imports during 1958 amounted to about 1.7 million pounds of dried shrimp, mainly from India. No shrimp is exported.

A research officer provided under the Colombo Plan to the Department of Fisheries has conducted a survey of shrimp fisheries for over two years. His survey located some of the shrimp

breeding grounds, but the survey was discontinued in favor of an investigation of the spiny lobster resources in the waters around Colombo.

Development of a fishery for shrimp is not included in the program of fisheries development under the Ten-Year Plan. Under present conditions it is unlikely that Ceylon will become an exporter of shrimp to the United States in the near future. (United States Embassy in Colombo, December 4, 1959.)



Colombia

MARKET FOR FROZEN TUNA INCREASING:

Frozen tuna was available in Barranquilla, Colombia, during most of November 1959. As the best grade of tuna retailed at only two pesos a pound (about 29 U. S. cents a pound at the free rate of exchange), it represented a saving to workers on their food bills. The tuna has been accepted by all sectors of Barranquilla, not merely in lower-class neighborhoods. As a result, distributors are now found in nearly all parts of the city, including the better residential areas. The tuna has been supplied by the Japanese fishing vessel Seiun Maru.

The fish canning firm engaged in the marketing of tuna recently made statements indicating that the marketing of tuna will greatly increase and will be extended throughout Colombia. The firm plans to introduce 500 tons of tuna monthly into the country. The fish will be unloaded on both the Pacific and Atlantic coasts. (United States Embassy report from Barranquilla, December 4, 1959.)



France

LOBSTER TAILS PACKED IN VACUUM-SEALED PLASTIC BAGS ABOARD VESSEL:

The French vessel Francoise Christine is the world's first craft equipped with an installation for packing spiny-lobster tails in vacuum-sealed plastic

France (Contd.):

bags. Launched in February 1959, the vessel sailed for Port-Etienne in Mauritius a few weeks later.

Two specialists, a packaging expert and an engineer, accompanied the craft on her first trip but remained onboard only 15 days until the crew had been trained to handle the vacuum-sealing plastic-packaging machinery.

Although the actual catch and packing on the first trip was not revealed, it is estimated that average production per trip will be around 25 metric tons. The *Francoise Christine* uses trawl nets for catching the spiny lobsters, which are cut, packed in plastic bags, vacuum-sealed, and then frozen.

Freezing is carried out in three tunnels with a capacity of three tons per 24 hours. The tails are then stocked in a cold storage hold with a temperature of -9°F . The hold has a capacity of 25 tons.

The *Francoise Christine* can also carry live spiny lobsters in tanks with a capacity of 70,000 to 80,000 lobsters.

A second craft, *Le Charleston*, which will be longer, 99 feet instead of 90 feet, will have a larger capacity, and will soon be ready to operate. It is estimated that the two vessels will, between them, produce from 200 tons to 250 tons of frozen products annually, equal to 500 tons of live spiny lobsters.

Special crushing equipment crushes the discarded edible part of the body for use in the making of lobster bisque. (*World Fishing*, November 1959.)



French Guiana

FISHERIES EXPANSION INCLUDED IN PROPOSED DEVELOPMENT PLAN:

Expansion of fisheries is included in a new economic development plan for French Guiana. Various parts of the plan have been under discussion for

some time and final completion was scheduled for December 31, 1959.

The three principal objectives of the plan as it concerns fisheries are: (1) to assure sufficient fish for consumption in French Guiana; (2) to exploit the shrimp grounds off the Guiana coast and develop at Cayenne a packing and shipping industry for shrimp; and (3) to build a plant for the manufacture of fish meal (for fertilizer and animal feed) by utilizing a fish known as "poisson limon," which is found in coastal waters and the estuaries of French Guiana. This species is plentiful on the muddy bottom and is not utilized as food at the present time. (United States Consulate, Martinique, November 10, 1959.)



German Federal Republic

CERTIFICATE OF INSPECTION FOR FISH MEAL IMPORTS REQUIRED:

An ordinance passed by the Hamburg Senate on February 14, 1958, "for the protection against the danger of introduction of salmonella through feedstuffs of animal origin imported from abroad," concerns West German imports of fish meal as well as other animal feeds. This ordinance forms a part of uniform German state legislation in this field, the provisions of which are applicable to all fish meal imports into Germany.

Although the United States exports very little fish meal to West Germany or any other country, an understanding of the regulations may save present or future United States exporters from losses. One misconception on the part of United States fish meal exporters is that the "certificate issued by the competent authority" mentioned in the ordinance (Section 2) means a certificate issued only by the U. S. Department of Agriculture. Officials of the Hamburg Hygienic Institute state that such certificates issued by competent Federal or state authorities are equally acceptable, but that they must be written in German. While such a certificate does not eliminate the necessity of inspection at the port of entry, German customs authorities may

German Federal Republic (Contd.):

turn back an uncertified shipment. Shipments found to be infested with salmonella may be sterilized under customs supervision at the port of entry and thereafter admitted. (United States Consulate dispatch from Hamburg, November 23, 1959.)

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APPROPRIATIONS FOR FISHERIES, FISCAL YEARS 1958/59 AND 1959/60:

Appropriations by the West German Federal Government for fisheries for the fiscal year beginning April 1959 and ending March 31, 1960, amounted to a-bout US\$4.1 million. Appropriations for

Guatemala

SHRIMP FISHERY TRENDS:

The Guatemalan shrimp fishery has developed slowly, due principally to the fact that there are no areas on the Pacific Coast where most of the shrimp resources occur. Informed observers estimate that eventually Guatemala can produce between 1-3 million pounds of headless shrimp a year. According to reports no shrimp exports have been made since August 1959. The break in the United States market has made it more profitable to sell the catch locally. Local retail outlets are now disposing of about 20,000 pounds of frozen shrimp a month, or all of the current production.

No official statistics on shrimp landings are maintained, but according to estimates by observers, landings (head-off weight) in 1956 and 1957 totaled 30,000 pounds, rose to 100,000 pounds in 1958, and were close to 300,000 pounds during the first 10 months of 1959.

For 1959 it is estimated that about 75 percent of the catch was *Penaeus schmitti* from the Caribbean Sea and about 20 percent was *Penaeus stylirostris* from the Pacific Ocean. The remaining 5 percent was a mixture of various species of *Penaeus* from both the Pacific and the Caribbean.

West Germany's Appropriations for Fisheries, Fiscal Years 1958/59 and 1959/60				
Purpose	Fiscal Year 1959/60 ^{1/}		Fiscal Year 1958/59 ^{1/}	
	1,000 Deutsche Marks	US\$ 1,000	1,000 Deutsche Marks	US\$ 1,000
Diesel fuel subsidy for luggers and cutters	4,000	959	3,000	719
Temporary medium-term loans for cutters and luggers . .	480	115	750	180
Revolving loan fund for building and modernization of cutters	350	84	500	192
Total in Revolving Fund	(5,000)	(1,198)	(4,650)	(1,115)
Loans from amortization of ERP investments for construction of factory-trawlers	6,000	1,438	6,000	1,438
Subsidy of interest rates of commercial loans for building and modernization of luggers, cutters, and factory-trawlers . .	400	96	600	144
Subsidy of interest rates of commercial loans for building of central freezing and distribution facilities	100	24	200	48
Subsidy of interest rates of commercial medium and short-term loans for trawler companies in financial distress . .	100	24	550	132
Management advice program for the cutter fishing companies	100	24	100	24
Exploratory fishing and gear research	800	192	500	120
Contribution to the Scientific Commission for the exploration of the Seas, Bonn	150	36	160	38
Operation and maintenance of the fishery research vessel Anton Dohrn	805	193	796	191
Federal Fisheries Research Institute, Hamburg, Including: .	1,997	479	2,601	623
Construction of new building for Institute ^{2/}	(300)	(72)	-	-
Construction of new building for Biological Institute, Helgoland ^{3/}	-	-	(785)	(188)
Testing of fishery products	(9)	(2)	(18)	(4)
Operation and maintenance of Federal Fisheries Policing and Protection Service of 3 vessels	1,941	465	1,957	469
Construction of third fisheries protection vessel ^{4/}	-	-	32	8
Contributions to International Organization:				
International Council for Exploration of the Sea, Copenhagen	24	6	24	6
Overfishing Convention of 1946, London	3	1	3	1
International Council for North Atlantic Fisheries	10	2	7	2
^{1/} Fiscal Year April-March.				
^{2/} Total cost of project DM4,449,000 (US\$1,066,000).				
^{3/} Total cost of project DM4,700,000 (US\$1,127,000).				
^{4/} Total cost of project DM2,997,000 (US\$718,000) vessel placed in Service in 1957.				

fiscal 1959/60 were lowered by about US\$200,000 from fiscal year 1958/59 appropriations. Funds for fisheries included subsidies on fuel oil for inshore craft, loans for construction and modernization of fishing vessels, subsidies on loans made to the fishing industry by commercial banks, and funds for operation of and construction of facilities for the Federal Fisheries Service.

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As of November 9, 1959, there were three shrimp vessels fishing in the Caribbean Sea and one in the Pacific Ocean. However, there were 3 more boats tied up for repairs in the Caribbean and one vessel under repair in the Pacific and scheduled to go into operation before December 1. A recently-arrived trawler-freezer was scheduled to start Pacific operations immediately.

In the spring of 1959, the Caribbean shrimp trawler fleet built up to 12 boats, but fishing slackened-off and 6 of the vessels returned to the United States. The fleet as of November 1959 consisted of two double-rigged (rigged for fishing two shrimp trawls simultaneously) trawlers, 60 and 68-feet in length, two old Biloxi-type luggers about 45 feet long (only

Guatemala (Contd.):

one operating), and two smaller craft about 35 feet in length (neither of which was active).

The trawler-freezer now in the Pacific operated there for about five weeks during the spring of 1959, then transferred to the Caribbean for a short period and returned to the United States for repairs. This vessel is a 78-foot converted purse-seiner. She is double-rigged and has glucose-brine freezing equipment. The other two vessels are standard-type shrimp trawlers.

No shrimp trawlers are under construction in Guatemala, but there are numerous and varied plans for bringing in more trawlers. Much will depend on the price of shrimp in the United States.

The Guatemalan Caribbean coast is extremely limited in area and so are the shrimp nursery grounds. Guatemala's Pacific coast, where most of her shrimp potential lies, is definitely handicapped in not having a port where vessels can get shelter, load and unload cargo, and obtain repairs.

There are only two shrimp fishing companies operating in Guatemala, with only one exporting shrimp in any amount. Practically all of the shrimp exported to the United States during 1959 were fresh. The fresh shrimp were packed in plastic bags with ice and transported by air. Air freight to Miami or New Orleans costs 5 U. S. cents a pound. Maximum plane capacity was 10,000 pounds per trip, but frequent trips were made with less than capacity loads.

Local wholesale prices run 75 U. S. cents a pound for shrimp 20 count and larger. Counts of 21-25 and over wholesale at 60 cents a pound. Very few shrimp over 30 to the pound are landed in Guatemala.

There are neither export controls nor export taxes. There is a municipality (severance) tax of 3 U. S. cents a pound, but an effort is being made to have this removed or reduced.

There is one small shrimp freezing plant in Guatemala. It is located at Champerico on the Pacific coast. Freezing is done in a cold room with a reported capacity of 5 tons daily. The plant also has a daily flake-ice capacity of 2 tons and a storage capacity of 5 tons. (United States Embassy dispatch from Mexico, November 18, 1959.)



Iceland

HOPES TO INCREASE SALES OF FROZEN FISH BLOCKS TO U. S.:

A United States Customs Court ruling has altered the tariff or customs classification of frozen fish fillet blocks, and effective September 15, 1959, fishblocks made from groundfish are dutiable under Tariff paragraph 720 (b) at either 12½ percent ad valorem or one cent a pound, depending on whether or not the blocks are packed in bulk or in containers weighing with contents, less than, or more than 15 pounds each. The definition of "immediate containers" by U. S. Bureau of Customs is the "outer cardboard carton holding the 4 or 5 frozen fish blocks." Therefore, fishblocks are now dutiable at 1 cent a pound instead of 1½ cents under the quarterly

fillet quota and 2½ cents if imported over the fillet quota. Also, imports of fish blocks now do not fall under any quota provisions.

An article in the Icelandic newspaper Morgunbladid of November 10, 1959, points out that the lower U. S. tariff regulations now in effect on frozen fish blocks should result in more exports of Icelandic fish blocks to the United States.

The article also stated the Customs ruling represented a tariff reduction of approximately \$300,000 a year for Icelandic shippers, based on 1959 sales of fish fillet blocks to the United States.

The export of fish fillets in block form (11 to 13 pounds per block) to the United States was begun in 1953.

Morgunbladid's reporter asked the director of the Icelandic freezing plants corporation what effect this would have on the sale of fish to the United States. "He stated that it would facilitate and, it was hoped, increase the sale of fish to that country. This makes the American market more favorable for us Icelanders, in comparison with other fish markets. . . . He wished to point out that advertising was unavoidable in order to maintain and develop markets in the United States. The market could undoubtedly be increased by means of suitable, sensible advertising but, unfortunately, the funds which the corporation could use for advertising were very limited.

"The market for fish in the United States is good," said the director, "and it will undoubtedly increase considerably. The consumption of fish in the United States is still very low and, even if the consumption of fish per capita does not increase, the population does so by approximately 3 million per year. In order to meet that increase the Americans have to obtain additional fish amounting to approximately 15,000 tons per year."

FISH-FREEZING PLANTS NEED MORE TRAWLERS:

Some of Iceland's outlying ports have obtained loans for the building of local freezing plants and there are now 38 such

Iceland (Contd.):

plants in Iceland. These plants are now turning to the Government for help in obtaining the fishing vessels necessary to ensure raw material to keep the plants operating.

The twelve 250-ton trawlers ordered in 1958 from East Germany form part of this scheme and 3 of these were expected to be delivered before the end of 1959. In addition, 8 larger trawlers are to be ordered from West German yards for delivery in 1960-61. A definite commitment has been made for 4 of these trawlers and favorable terms are reported to have been obtained.

Considerable dissatisfaction has been expressed over the performance of the first of the East German 250-ton trawlers, which was delivered to an Icelandic north coast firm. It is claimed that the East German trawlers have a very small capacity for their size and that they are not really suitable for the purposes for which they were bought--fishing in home waters. (The Fishing News, November 6, 1959.)

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FISHERY LANDINGS,
JANUARY-SEPTEMBER 1959:

Icelandic fishery landings during January-September 1959 were 15 per cent higher than in the same period of 1958 and 29 per cent higher than during

January-September 1957. Cod and haddock landings were down, but landings of herring, ocean perch, and flounder were up in 1959. (Aegir, November 1, 1959.)

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FISHING FLEET TRENDS,
NOVEMBER 1959:

Since the stevedores at Grimsby, England, on October 26, 1959, lifted their ban on unloading fish from Icelandic trawlers, those vessels have reported good returns on their catches. The Icelandic trawlers have also received high prices at other British ports and in West Germany.

In November, the Icelandic trawler fleet was concentrating on the cod fishery off Iceland and Greenland. However, three trawlers were reported making good catches of ocean perch on new grounds discovered by the Germans.

The City of Reykjavik on November 3, 1959, authorized a loan of about Ikr. 10 million (about US\$615,000) in foreign currency to start the program of converting from steam to Diesel the trawlers owned by the Reykjavik City Trawler Company. It is expected that the Ingolfur Arnarson will be the first vessel to be converted starting in the spring of 1960. Complete conversion will cost about Ikr. 5-7 million (US\$308,000-431,000) per vessel. After conversion, operating costs will be reduced and the hold capacity increased from 250 metric tons to 300 tons.

For several months a controversy has raged over the many alleged shortcomings of the 250-ton trawlers built in East Germany. Three of the trawlers delivered in 1958 have been tied-up in Akureyri for repairs. According to reports, the aluminum lining of the fish holds is inferior and all the concrete ballast has had to be replaced. In addition, all the auxiliary engines of East German manufacture are reported to have broken down. Five East German shipyard experts have been in Iceland to try and correct the faults in the vessels. (The United States Embassy in Reykjavik reported on November 11, 1959.)

Note: Iceland kroner converted at rate of Ikr. 16.26 equal US\$1.

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Icelandic Landings/ by Species, January-September 1959 with Comparative Data			
Species	January-September		
	1959	1958	1957
	..... (Metric Tons)		
Flounders:			
Plaice	768	536	967
Lemon sole	212	153	1,115
Megrim	629	362	142
Witch	143	156	89
Dab	33	19	-
Halibut	751	666	559
Skate	558	602	162
Cod	203,457	221,127	180,961
Haddock	12,672	14,558	15,417
Ling	1,779	3,063	2,362
Wolfish (catfish)	8,429	9,371	8,416
Ocean perch (redfish)	85,687	63,256	47,438
Saithe	8,898	9,751	8,931
Cusk	2,364	4,213	2,795
Herring	159,916	94,151	105,342
Other	1,314	1,154	1,974
Total	487,610	423,135	376,670
1/Except for herring which are landed round, all fish are landed drawn.			

Iceland (Contd.):

NONGOVERNMENTAL 1960 TRADE AGREEMENT WITH EAST GERMANY INCLUDES FISH:

The nongovernmental trade agreement between Iceland trade associations and East Germany was renewed in Berlin on November 10, 1959. The agreement provides for exchange of goods of about US\$5 million each way or about the same as in 1959.

On November 14, 1959, it was announced that the East Germans would purchase 10,000 barrels of Iceland south coast herring. Normally East Germany has taken about 15,000 barrels of salted herring from the south coast fishery, but due to unfavorable weather and scarcity of fish to November 12, it has been difficult for Iceland to fulfill commitments for herring exports. (United States Embassy from Reykjavik dated November 20, 1959.)

**Italy****FISH CANNERS ASK RESTRICTIONS ON JAPANESE CANNED TUNA IMPORTS:**

Italian fish cannery and dealers are asking the Government to restrict imports of Japanese canned tuna in oil. The Italian Government is studying the effect of Japanese canned-tuna-in-oil imports on the Italian fish-canning industry. A concrete proposal was expected to be made during Japan-Italy trading negotiations under way the latter part of 1959

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JAPANESE FROZEN TUNA INCLUDED AMONG FREE TRADE ITEMS:

Italy is expected to include Japanese frozen tuna with items of free trade, and canned salmon and crab meat with bartered products. In the past, Japan's frozen tuna exports to Italy were bartered for Italian rice and for this reason tuna exports to Italy were limited on the basis of the quantity of rice imported by Japan to about 10,000 metric tons a year. Italian tuna imports from Japan amounted

to 11,738 tons in 1958. However, in 1959 Japan's imports of Italian rice were reduced because of continued bumper crops and frozen tuna imports by Italy were cutback accordingly. But including tuna by Italy with items of free trade may mean an increase in imports of Japanese tuna. Japanese exporters are in favor of raising the quota of frozen tuna exports to Italy to 20,000 tons a year. (Fisheries Economic News, November 10, 1959.)

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TUNA INDUSTRY:

The Italian Association of Fishing Industries states that Italy's principal ports for imported frozen tuna are: Venice, Bari, Naples, Genoa, Trapani, and Palermo. During the past year or so, Italy has been receiving direct landings of tuna by Japanese tuna vessels, but it also receives imports from Norway and one or two other European countries.

There are about three leading processors of imported tuna. One is located in Genoa with a plant in the vicinity of Venice; another is also located in Genoa but has plants in Chioggia (Province of Venice), Favignana, and Formica; and the third one is located in Rome with a plant at Bari. One of the two firms located in Genoa that processes imported tuna, through a subsidiary, operates Italy's largest "tonnare" (areas where tuna are fished with fixed nets from shore) at Favignana and Formica, two small islands off the northwest coast of Sicily, in the Province of Trapani. Tuna caught in those islands is processed there. Tuna is also caught off Sardinia by another Italian firm. (United States Embassy report from Rome dated December 13, 1959.)

**Japan****BERING SEA TRAWLER FISHERY TRENDS:**

The Kinyo Maru, one of two fish-meal factoryships and fleets licensed in 1959 by the Japanese to operate in the Bering Sea, in mid-October 1959 was reported to have left the fishing grounds after attaining its production goal. The fleet, led by its factoryship, produced 13,000 metric tons of fish meal and some 2,000

Japan (Contd.):

tons of fish solubles, fish oil, frozen fish, etc.--a grand total of 15,000 tons of products. The fleet exceeded the 1958 production of fish meal by 4,530 tons and was scheduled to dock at Hakodate, Hokkaido, the latter part of October.

The second fish-meal factoryship fleet, Tenyo Maru, owned by two Japanese fishery firms, returned to Tokyo early in November. This was the first year of operation in the Bering Sea for this fleet, but it attained its production goal of 8,000 tons of products, mostly fish meal.

In 1960 four Japanese fish-meal factoryships and fleets are expected to operate in the Bering Sea. Two fleets will be operated by one fishery firm and will consist of the factoryships Kinyo Maru and Nissho Maru. Another fishery company, the one that operated the Tenyo Maru in 1959, will use a new mothership. A fourth fleet is being planned by still another fishery firm which expects to use as a factoryship the Gyokuei Maru, a 9,971-ton vessel which has been used as a tanker for Antarctic whaling. (Suisan Tsushin, November 6, 1959.)

Note: See Commercial Fisheries Review, September 1959, p. 76.

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CANNED FISHERY PRODUCTS EXPORTS, JANUARY-JULY 1959:

For the first seven months of 1959, Japanese exports of canned fishery products were 6.8 percent greater than in the same period of 1958. The increase was mainly in salmon.

Japanese Exports of Canned Fishery Products, January-July 1958 and 1959		
Product	January-July	
	1959	1958
	... (Cases) ...	
Crab (king and other)	399,251	387,666
Tuna:		
In oil	994,117	614,412
In brine	1,046,201	1,349,500
Other	31,327	49,357
Total Tuna	2,071,645	2,013,269
Mackerel-pike (saury)	402,829	440,905
Sardine	296,692	338,992
Salmon	1,058,107	885,461
Other fish	213,081	111,757
Shellfish	189,328	159,056
Other aquatic products	3,304	3,259
Grand Total	4,634,237	4,340,365

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CANNED PACK OF MACKEREL-PIKE:

The Japanese Export Canned Mackerel-Pike Fishery Association has announced the pack of canned mackerel-pike as of November 15, 1959: in tomato sauce 65,582 actual cases; in water 387,574 cases; and in jelly 500 cases--total 453,656 cases.

Since the canned pack quota has been established at 650,000 cases, there was still 196,344 cases to be packed to reach the quota.

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FREIGHT RATES TO UNITED STATES FOR CANNED GOODS INCREASED:

Rates per ton that are 5 percent higher became effective on October 1, 1959, for ocean freight shipments of canned goods from Japan to United States Atlantic and Pacific ports:

To Pacific Coast:	
\$24.50--all canned products	
21.00--pet foods	
To Atlantic Coast:	
\$30.00--all canned products	
26.25--pet foods.	

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EXPORTS OF FISHERY PRODUCTS, JANUARY-SEPTEMBER 1959:

Exports of fishery products by Japan during September 1959 were valued at US\$21.4 million--higher by 20.9 percent from the August exports of \$17.7 million and up 91.1 percent from the same month in 1958.

January-September 1959 fishery products exports were valued at \$117.7 million, an increase of 12.6 percent as compared with January-September 1958. Fishery products exports in the first nine months of 1959 made up about 4.9 percent of Japan's exports of all products. (United States Embassy, Tokyo, November 6, 1959.)

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PLANS MADE TO ADVERTISE CANNED TUNA IN UNITED STATES:

Early in 1959 the Japanese had announced that ¥50 million (US\$139,000) would be used to advertise canned tuna in the United States. Half of the money

Japan (Contd.):

was provided by the Japanese Government and the other half by the Japanese canning and freezing industries. The Fishery Agency and the International Tuna Society have been studying how to spend the money. A plan for using one-half of the amount has been announced and it was expected to be implemented late in December 1959.

The money is to be spent as follows:

1. Newspapers - ¥6,038,377 (US\$16,800). Will be concentrated in northeastern states. Ads for Japanese canned tuna will appear 3 times in 14 newspapers, including the New York Times and the Chicago Tribune.
2. Trade paper - ¥774,132 (US\$2,150). Ads will appear 4 times in the weekly Supermarket News.
3. Recipe leaflets - ¥5,687,838 (US\$15,800). About 200,000 colored leaflets will be distributed at supermarkets.
4. Distribution of general information - ¥12,500,276 (US\$34,700). Articles and information on tuna will be provided to newspapers and magazines and also to retail stores. These will be brought to the attention of food editors by personal interviews, telephone, and mail.

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Canned Tuna 1/ Exports by Country of Destination, January-June 1958-59			
Destination	January-June		January-December
	1959	1958	1958
	... (1,000 Actual Cases) ...		
United States . . .	939	1,215	2,191
West Germany . . .	105	113	287
Canada	80	70	149
Switzerland	67	40	77
Italy	38	10	37
Belgium	30	29	69
Netherlands	21	20	33
Lebanon	22	11	23
Britain	8	9	58
Egypt	15	-	-
Others	144	65	205
Total	1,469	1,582	3,129

1/Includes all types of packs--in oil, in brine, etc.

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FISHING INFORMATION ON 1959/60 WINTER ALBACORE SEASON:

According to a forecast by the Fisheries Laboratory of Tokai University, Shimizu, albacore tuna was expected to show up late during the winter of 1959/60 off Japan. It was expected that they would first show 1,200 miles ENE. of Nojima Cape around 37°03'-39°00' N. and 163°-164° E., about mid-November 1959, for only a very short time. There was also hope that the main run of the albacore would show up 700-750 miles NE. of Nojima Cape, or around 38°-40° N. and 161°-162° E., from mid-November up to mid-December 1959.

Formerly about 30 albacore boats used to fish from Shizuoka-ken ports beginning late in October. But in 1959 through mid-November practically none were in operation. It was expected that the boats would shift from mackerel-pike or saury fishing to albacore fishing toward the end of November 1959. The cannery of Shizuoka district were waiting for the winter albacore to show up.

A research institute of Shizuoka Prefecture, Japan, released in November 1959 information on winter albacore fishing conditions off Japan.

"Oceanic Conditions: In the sea area east of the Sanriku (central part of Honshu), water temperatures are similar to the same period in 1958. Kurile currents are more powerful and lower temperatures are noted in general. The Black Current is running in a northeasterly direction near Kinkazan Island (off Miyagi Prefecture) and the water temperature of 18° C. (64.4° F.) is reaching 40° north latitude. A large warm current extends northward between 149°-154° east longitude and this pattern is expected to continue. The cold current is powerful east of 160° east longitude and no warm current is seen to be protruding into the area.

"Fishing Conditions: Because of a powerful cold current coming from the north, the southward movement of winter albacore tuna is expected to be earlier than usual. In the sea area north of 38° north latitude at 149°-152° east

Japan (Contd.):

longitude and 153°-154° east longitude, schools are expected to appear gradually and it is promising as a principal fishing area for offshore hook-and-line fishing. Conditions east of 160° east longitude do not warrant hook-and-line fishing judging from oceanic conditions. The promising fishing area for long-line fishing is expected to be at 164°-166° east longitude and 29°-32° north latitude with water temperatures ranging 19.8°-22.3° C. (67.6°-72.1° F.). (Fisheries Economic News, November 21, 1959.)

RATE-OF-CATCH FOR ATLANTIC TUNA DROPS:

A substantial drop in the rate-of-catch of Atlantic tuna by Japanese fishing vessels is reported. Early in December 1959 a fleet of 20 to 40 long-line vessels was engaged in the Atlantic tuna fishery. Japanese vessels started fishing Atlantic tuna almost three years ago. The first year an average daily catch of 4,000 kan (16.6 metric tons) per vessel was reported. The next year it dropped to 2,000 kan (8.2 tons), but this was assumed to be natural for this type of ocean fishing. But in 1959, particularly since October, the catch has declined further. For instance, one vessel caught only a daily average of 1,200 kan (5 tons) and another only 670 kan (2.8 tons).

But in spite of the drop in catch rates, a Japanese fishery firm was planning to send two large tuna vessels--one 470-tons and another 1,100 tons--in January to the Atlantic for the first time. All other large Japanese fishery companies have tuna vessels fishing tuna in the Atlantic.

SOVIET FISHERIES MISSION VISITS JAPAN:

A four-man Soviet fisheries mission arrived in Japan on November 17, 1959, for approximately three weeks of inspection of Japanese fishery facilities. The group comprised the chief of the Kamchatka Fish Conservation Bureau; a staff member of the Kamchatka Branch of the Pacific

Fisheries and Oceanographic Laboratory; the chief of the Inshore Exploratory Fishing Group; and an interpreter attached to the Maritime Province People's Economic Council. Their itinerary took them to Hokkaido from November 20 to 27 for visits to salmon hatcheries and other fishery installations, after which they went to Nagasaki, Shimonoseki, and Yaizu to gather information on mackerel and tuna fishing.

The exchange of such missions has been recommended in each of the past three years by the annual conference of the Japan-Soviet Convention on Northwest Pacific Fisheries. In 1957 the exchange did not materialize because of delays in the Soviet response to Japanese communications. In 1958 each side sent about a dozen of its fishery experts, and the reconnaissance tours were conducted on a large scale in both countries. In 1959 Japan sent only four men, headed by the research chief of the Japanese Fisheries Agency, and the group confined its activities largely to an inspection of salmon-fishing operations in Kamchatka over a three-week period in August-September.

The reciprocal Soviet mission was naturally concerned principally with salmon, especially with salmon-hatching activity in Hokkaido and with Japan's procedures for enforcing the conservation regulations established by the Japan-Soviet Fisheries Commission. Soviet accusations of Japanese violations of those regulations caused the Japanese delegation much trouble at the last annual meeting of the Commission.

The 1959 mission, like that which came to Japan in 1958, also showed an interest in whatever information it could obtain about the operating techniques in other major Japanese fisheries. Reports indicate that since 1958 the Soviet fishery for saury off Japan's coast has been put on a commercial basis and there are strong indications that the Russians intend to move on a large scale into fisheries for mackerel, tuna, and bottom fish in areas which are now dominated by the Japanese.

At their first press conference in Tokyo on November 23, the Russian Mission's spokesman reported that Soviet salmon production in Kamchatka in 1959 was 25 percent under the plan because of the effects of the Japanese high-seas fishery. In Hakodate, at another press conference on November 28, it was pointed out that the Soviet fisheries had made a very poor catch, especially of pink salmon; also that the U.S.S.R. might find it necessary to shut down salmon fishing in Kamchatka altogether in 1960, but that this would have little effect unless the Japanese also took steps to cut down their catch as much as possible. (United States Embassy in Tokyo, December 3, 1959.)

YELLOWFIN TUNA EXPORT PRICE TO UNITED STATES FIRMER:

In November 1959 landings of tuna from the Indian Ocean consisted of fewer yellowfin tuna but more 'bluefin Indo' and albacore tuna. This has firmed up the export price of frozen yellowfin to the United States. The price in November 1959 was US\$255 f.o.b. a ton (gilled and drawn fish of 20-80 lbs.) or about \$10 higher than in August. The landed price of fresh yellowfin was about ¥98 a kilo (\$247 a short ton). The higher Japanese export price is also attributed to a sharp decline in the transshipments of Atlantic tuna to the United States since August 1959.

Japan (Contd.):

**TRANSSHIPPED ATLANTIC
FROZEN TUNA EXPORTS
TO UNITED STATES DECLINE:**

Japanese transshipped frozen Atlantic tuna exports to the United States that began in August 1958 have dropped off sharply because of the large percentage of rejects at United States west coast canneries in April and May 1959. On the other hand, there has been a sub-

stantial increase in direct landings of frozen Atlantic tuna at ports in Yugoslavia, France, and Africa. More recently direct landings in Colombia, the Canary Islands, Spain, and Libya were beginning to materialize. Further development of those new markets is expected in 1960.

**STATUS OF TUNA STOCKS IN
INDIAN AND PACIFIC OCEANS:**

The Director of the Tokau University Fisheries Research Institute issued the following statements about the status of tuna stocks in the Indian and Pacific Oceans:

(1) In recent years large-size tuna caught in the Indian and Pacific Oceans are decreasing in number and more small and medium fish are being caught. It is, therefore, necessary to change fishing methods to catch more medium and small size fish.

(2) Small and medium size tuna have more mobility and the location of fishing grounds changes according to oceanic conditions. Ocean conditions are deemed important and each Japanese vessel is requested to report on its position and water temperatures in the area

it is fishing to assist in assembling oceanographic data.

In recent years the tuna catch ratio in the Indian and Pacific Oceans has been on the decline and exploitation of new fishing grounds has extended into the Atlantic Ocean. All operating Japanese tuna vessels have expressed concern over decreased catches and increased operating days to catch a full load of tuna.

Japanese Frozen Atlantic Tuna Direct Exports and Transshipments, 1959

	January-March		April-June		July-September		October-December ^{1/}	
	Tons ^{2/}	Trips	Tons ^{2/}	Trips	Tons ^{2/}	Trips	Tons ^{2/}	Trips
United States (transshipments)	7,592	21	6,082	19	2,751	11	840	4
Direct landings by Japanese fishing vessels:								
Italy	2,864	9	2,612	7	4,362	18	2,080	8
Yugoslavia	435	1	1,469	5	3,325	10	3,160	9
France	-	-	476	2	1,972	5	2,368	8
Dakar (Africa)	-	-	-	-	1,145	4	392	3
Others	454	2	-	-	574	3	530	3
Total other than U. S.	3,753	12	4,557	14	11,378	40	8,530	31

^{1/}Planned.

^{2/}Short tons for shipments to United States, and metric tons for other countries.

This condition is attributed to the fact that the catch of large fish is down and catch objectives should be shifted to small and medium fish which are more abundant than large fish. Schools of small and medium tuna are usually thick, but they are so sensitive to water temperature that a very small variation in the Indian Ocean brings about a change in their location. Accordingly, selecting fishing grounds becomes more difficult without proper oceanographic data.

Despite the fact that tuna fishing operations have been going on for the past few years in the Indian and Pacific Oceans, there are few data available on seasonal changes in ocean currents in the sea areas where tuna fishing grounds exist.

At present about 140 tuna vessels belonging to Shizuoka and Mie Prefectures are furnishing data which will be useful in assessing tuna fishing conditions. But in view of the great expanse of the Indian and Pacific Oceans, the data furnished are not adequate and the Fisheries Research Institute is calling upon vessels belonging to other prefectures to cooperate and is planning to put the collection of data on a nation-wide basis.

Japan (Contd.):

FISHING VESSEL CONSTRUCTION UP SHARPLY:

There has been a sharp increase in fishing vessel construction in Japan, according to fishing vessel construction data for the first half of 1959 compiled by the Fisheries Agency. Actual construction of steel fishing vessels totaled 12,153 tons (30 vessels) in 1957, 18,412 tons (71 ships) in 1958, and 17,212 tons (103 ships) for the first half of 1959. Of the total for January-June 1959, tuna vessels amounted to 9,794 tons (29 craft), about twice as much as tuna vessel construction for 1958 of 4,731 tons (19 craft). Most of the increase in fishing vessel construction is in tuna vessels. (Fisheries Economic News, November 23, 1959.)

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EMIGRATION OF FISHERMEN TO ECUADOR PROPOSED:

Nagasaki Prefecture, westernmost prefecture of Japan, is planning to send a large number of fishery emigrants to Ecuador, South America. It has asked the Tokyo Fisheries College's scientific research mission, which was expected to leave Japan for Ecuador, to make an investigation. The mission is scheduled to use its training ship Umitaka Maru, 1,450 tons, for an investigation of the Galapagos Islands. Nagasaki Prefecture requested the mission to make a study of resources, fishing methods, and fishing seasons of shrimp, sardines, and tuna in Galapagos waters. (Suisan Tsushin, November 9, 1959.)



Latvia

FISH FACTORYSHIP ADDED TO FLEET:

The fishing fleet in Latvia now includes a new "floating fish processing factory" or factoryship, according to a report in Fiskets Gang (November 12, 1959), a Norwegian fishery trade periodical. The vessel, which is one of Latvia's best and most modern for catching and processing fish at sea, departed in November 1959 on its maiden

trip, according to a November 27 news item in Vodnyi Transport. The factoryship was built in a shipyard in Niko-laevsk.



Malaya

JAPANESE-MALAYAN TUNA FIRM SLOW GETTING STARTED:

The joint Japanese-Malayan tuna fishing enterprise, which was established at Peran, Malaya, in the summer of 1959, is slow getting started. The construction of a cold-storage plant was under way in November. Of the two fishing vessels scheduled to start fishing for the firm, only one, the Koshin Maru, 99 tons, of Mie Prefecture, has already been chartered. The company hopes to be in full operation by April 1960, when canned tuna for export to Southeast Asia, and fish sausage and fresh tuna for local consumption will be produced and on sale.



Mexico

PROGRAM INSTITUTED FOR SALE OF FISH AT ESTABLISHED PRICES:

Considerable public and press discussion in Mexico was evident during the summer of 1959 regarding the effort of the Federal Government to assure more reasonable prices of fish to the ultimate consumer. The Direccion General de Pesca has instituted a program whereby fish may be sold at established prices, either to the principal fish market in Mexico City (the Ferreria), or elsewhere. The principle opponents of the program have been some of the fish distributors.

Some of the fishermen are not too pleased with the plan, as they must bring in some of what has hitherto been considered inferior fish which bring lower prices in order to assure sufficient fish on the market. Despite these difficulties, it would appear that the Government program assures the fisherman the opportunity of selling his fish at an established price when there is an

Mexico (Contd.):



A Chilean "Eat-Fish" poster—one of several used in Mexico to increase the consumption of fish.

abundance of fish and when there are insufficient fish, apparently the fisherman can sell the fish to markets other than the principal market in Mexico City, if he believes it is to his advantage. (United States Consulate dispatch from Veracruz, dated October 12, 1959.)

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SHRIMP INDUSTRY, NOVEMBER 1959:

Shrimp landings at Mexican east and west coast ports January-July 1959 totaled 77.8 million pounds (heads-on), 48.7 percent more than the landings in the similar period of 1958. Landings on the west coast were up 47.1 percent and those on the east coast rose 53.2 percent.

Table 1 - Mexican Shrimp Landings (heads-on), January-July 1958-1959		
	1959	1958
	.. (Million Lbs.) ..	
Pacific coast	56.1	38.2
East coast	21.7	14.2
Total	77.8	52.4

Vessels Registered for Shrimp Fishing: During January-July 1959, a total of 7,619 fishing craft was registered for shrimp fishing in Mexico. Of this total, only 1,198 were ves-

sels of over 10 tons. Due to possible duplication, it is estimated that there were only about 1,000 active shrimp trawlers operating January-July 1959. Fishing craft 10 tons and under are largely dugout canoes powered by oars, sail, or outboard motor and used for fishing in the inland bays and lagoons.

Table 2 - Shrimp Fishing Craft Registered in Mexico, January-July 1959			
Vessel Size	Pacific Coast	Gulf Coast	Total
	..... (Number)		
1-10 tons	3,503	2,918	6,421
11-50 tons	585	343	928
51-100 tons	155	90	245
101 tons and over	11	14	25
Total	4,254	3,365	7,619

Current Ex-Vessel Prices: Ex-vessel prices shown in table 3 are for Salina Cruz (west coast) and Ciudad del Carmen (Gulf of Mexico) and are current as of November 5, 1959. At that time in those two ports there was no price differential on the basis of species or color. This, of course, is unusual and reflects United States market conditions. In Mazatlan and Guaymas white shrimp commanded a higher price than brown.

Table 3 - Ex-Vessel Shrimp (heads-off) Prices, November 5, 1959		
Size (Number/Lb., Headless)	At Salina Cruz	At Ciudad del Carmen
	.. (U. S. Cents Per Pound) ..	
Under 15	44	53
16-20	42	48
21-25	33	41
26-30	27	36
31-35	-	32
36-40	25	-
41-50	20	27
Over 51	15	-
51-60	-	17
Over 61	-	12

Packing, Processing, and Shipping Costs: At Salina Cruz and Ciudad del Carmen, November 1959 costs (in U. S. cents per pound) for packing, processing and shipping were: packing material, 3; export duty and other charges, 4; ocean freight to United States, 3; hauling charges, 1/2; storage charges, 1/2; association dues, 1/4. In addition, for grading, packing, and freezing at Salina Cruz costs were 7 cents a pound and at Ciudad del Carmen 3-1/2 cents a pound. At Salina Cruz there is also a cost of 1-1/2 cents a pound for freight to port of embarkation. Total costs at Salina Cruz were 19.75 U. S. cents a pound and at Ciudad del Carmen 14.75 U. S. cents a pound.

Export Prices: On shipments from the Carmen-Campeche Gulf of Mexico area, export prices for shrimp are based on f.o.b. Brownsville, Tex., prices minus 15 U. S. cents a pound. Export prices at Salina Cruz are also based on Brownsville prices minus 20 U. S. cents a pound.

Table 4 - Export Prices for Frozen Shrimp f.o.b. Mazatlan, November 1959			
Size (Headless Count Per Pound)	White Shrimp		Brown Shrimp
	Quality		
	1st	2nd	
	..... (U. S. Cents a Pound)		
Under 10	72	67	62
Under 15	72	67	58
16-20	72	67	58
21-25	56	51	49
26-30	47	42	42
31-40	38	35	35
41-50	33	30	30
50-65	28	26	26
Over 66	26	23	21

Mexico (Contd.):

At Mazatlan on the central west coast of Mexico, November 1959 export or f.o.b. prices for frozen shrimp (as determined by deducting sales commission of 7 and 8 percent in the United States, freight, and border crossing fees) varied from 72 U. S. cents a pound for under 15 count first quality white shrimp to 21 U. S. cents a pound for 56 and over count brown shrimp.

Exports: Mexican shrimp exports during the first nine months of 1959 totaled 41.8 million pounds of frozen shrimp, valued f.o.b. at 315.4 million pesos (US\$25.2 million). Exports of fresh, canned, and dried (mostly fresh) shrimp amounted to only 10,000 pounds, valued at 76,000 pesos (US\$6,100). The bulk of the frozen shrimp exports were shipped to the United States. Of the 109,000 pounds shipped to other countries, a large percentage went to Nicaragua and some to Guatemala and Jamaica. Nearly all of the fresh shrimp exports of 9,500 pounds were shipped to the United States. Of the canned shrimp exports of 440 pounds, half were shipped to the United States and the other half almost equally divided among Guatemala, Spain, France, and Canada. (United States Embassy dispatch from Mexico, November 5, 1959.)



Morocco

LANDINGS OF FISH AND SHELLFISH, 1958:

During 1958 landings of fish and shellfish in Morocco amounted to about 355 million pounds. Landings of sardines made up 76.8 percent of the total. Other varieties of importance were about 17 million pounds of bluefin tuna (includes small amount of skipjack), about

Latin Name/	Common Name	Quantity, 1,000 Lbs.
<i>Sardinops nitzschoides</i>	Sardine or pilchard	272,844
<i>Engraulis encrassolobus</i>	Anchovy	100
<i>Thunnus thynnus</i>	Bluefin tuna	16,838
<i>Sarda sarda</i>	Atlantic bonito	1,608
<i>Katsuwonus pelamis</i>	Skipjack tuna	132
<i>Scomber scombrus</i> & <i>S. colias</i>	Mackerel & Spanish mackerel	7,111
<i>Axius bias</i>	Frigate mackerel	5,393
<i>Euthynnus aletteratus</i>	Little tuna	260
<i>Merluccius merluccius</i>	Merluccius	571
<i>Merluccius senegalensis</i>	Hake	4,367
<i>Pomatomus saltatrix</i>	Bluefish	7,227
<i>Xiphus</i>	Swordfish	486
<i>Pagellus</i> sp.	Sea bream	4,327
<i>Trachurus trachurus</i>	Horae or jack mackerel	4,011
<i>Sargus vulgaris annularis</i>		860
<i>Chrysotereus surata</i>		57
<i>Solea aequia</i>	Maigre	1,239
<i>Lichia vadiago</i>		539
<i>Trigla</i> sp.	Gurnards	1,084
<i>Oreomorus unicolor</i> & <i>Lachnaraia</i>		482
<i>Morone</i> sp.	Bass or white perch	133
<i>Mugil</i> sp.	Mullet	121
<i>Mullus surmuletus</i>	Surmullet	721
<i>Conger conger</i> & <i>Muraena helena</i>	Conger & morey eels	345
<i>Yngulla valeria</i>	Common eel	45
<i>Aloia aloia</i> & <i>A. pinta</i>	Shad	378
<i>Scorpaena scorpa</i> & <i>S. porcus</i>	Scorpionfish	374
<i>Saja saja</i>		374
<i>Rhombus maximus</i>		22
<i>Solea solea</i>	Common sole	614
<i>Raja</i> sp.	Skates & rays	791
<i>Mustelus</i> or <i>Squalus</i> sp.	Sharks or dogfish	701
<i>Citharus luteus</i>		66
<i>Xeno</i> (sinner)		65
<i>Parichthys longipinna</i>		66
<i>Loligo</i> & <i>Sepia</i> sp.	Squid or cuttlefish	1,128
<i>Parapenaeus longirostris</i>	Shrimp	2,064
<i>Palinurus vulgaris</i> & <i>P. mauritanicus</i>	Spiny lobster	45
<i>Homarus vulgaris</i>	Common lobster	25
<i>Scyllarus coriaceus</i>	Twelve lobster	27
<i>Mytilus edulis</i>	Mussel	156
	Unclassified fish or shellfish	6,398
		135,500
Total		355,000

Some are classified as to correct spelling of Latin names, others are mispellings in original data corrected to correspond to United States usage.

2 million pounds of bonito and little tuna, and close to 22.5 million pounds of common mackerel, Spanish mackerel, and frigate mackerel. In addition, the 1958 landings included 7.2 million pounds of bluefish, 2.1 million pounds of shrimp, and 4.9 million pounds of hake or whiting.

About 3 million pounds of tuna are canned and a small amount frozen--mostly exported to the French Customs Zone. Most of the tuna was caught by sardine purse seiners, but about one-third was caught by madragues (fixed nets leading out from shore). There are nine madragues fished in Moroccan territorial waters. (United States Consulate, Casablanca, November 30, 1959.)

Nicaragua

SHRIMP FISHERY TRENDS, APRIL-JUNE 1959:

Shrimp landings in Nicaragua fell off considerably during the second quarter of 1959 and the Collector of Customs reported only 107,000 pounds, valued at US\$46,316, exported during that period. About 90 percent of the exports went to the United States.

A French-owned concern is going ahead with plans for a modern fish processing and packing plant in Bluefields, on the Caribbean Sea coast of Nicaragua, and plans to buy some fishing boats in the United States. (United States Embassy at Managua reported on November 10, 1959.)



Norway

FROZEN FILLET SALES UP FOR 1958/59:

The Norwegian cooperative sales organization Norsk Frossenfisk A/L reports a total production of 19,546 metric tons in 1958/59 (July-June), with a gross sales value of nearly Kr. 67 million (US\$9.4 million). Fillet sales were 12 percent higher than in 1957/58, and total exports increased by about Kr. 5

Norway (Contd.):

million (about US\$700,000). Exports to the United States alone were valued at Kr. 25 million (US\$3.5 million) as against only Kr. 7 million (about US\$1 million) in the preceding year.

Meanwhile, Norway's second largest frozen fish producer has announced plans to expand the capacity of its fillet plant at Hammerfest, North Norway, from 5,000 to 10,000 tons a year. This will provide jobs for some 1,000 plant workers, as compared with about 450 at present.

Under a Government bill submitted to Parliament early in November, the North Norway Development Fund would be authorized to guarantee a Kr. 12.5 million (US\$1.8 million) loan to Norway's second largest frozen fish producer. The loan would help to finance the plant expansion, held to be of great importance to the economy of western Finnmark.

* * * * *

RESEARCH VESSELS SEEK FISH IN DISTANT WATERS:

The Norwegian ocean research vessel G. O. Sars left the port of Aalesund early in December 1959 to search for the whereabouts of herring in the North Atlantic. After locating the main shoals, G. O. Sars will follow the herring on their eastward migration to spawn off the Norwegian coast.

During the second cruise, expected to start January 1960, the vessel was to be joined by another research vessel, the Johan Hjort, which in December was surveying fishing grounds off West Africa. Initial reports indicated that those waters offer very good conditions for factory trawlers.

Meanwhile, two Sunnmore fishing operators are actively planning to participate in the rich sardine fisheries off Ghana, possibly on a year-round basis. As a first step they have joined Ghana interests in setting up a Ghana-registered fishing firm. (News of Norway, December 10, 1959.)

Poland

FISHING INDUSTRY SEEKS NEW FISHING GROUNDS IN ATLANTIC:

With a marked decline in the Baltic fisheries over the past few years, Poland has turned her attention to searching for new distant-water fishing grounds. At the present time Poland is landing something over 80,000 metric tons of Baltic-caught fish and about 125,000 tons of fish caught in the North Sea and off the Norwegian coast.

The heavy building program for fishing vessels, and the fact that the first of the new series of factoryships is due to go into production in 1960, means however that landings are likely to be increased. By 1965, Poland plans to be landing 260,000 tons of fish annually, and nearly twice that amount ten years later. That is, she will have the capacity to do so, if she can find the fish.

Besides the Baltic and the North Sea, Poland is interested in the north and central Atlantic. But earlier this year the Jan Turlejski left Gdynia on an experimental voyage to test the possibility of using bottom trawls along the coast of West Africa. Fishing off Port Etienne, Mauritania, about 10 tons of various species of fish were caught in four days of fishing, and this was considered successful enough to make the trip worthwhile.

During May 1959, a second expedition left for Labrador Banks. Three trawlers, all oil-burning steam vessels of 500 tons, took part, much of their fishing equipment being supplied by East Germany, who also offered technical advice. The expedition took 31 days and about 200 tons of ocean perch were caught.

The third expedition in 1959 left in July for a 3-month voyage to be made by a 79-ft. cutter to the Bay of Biscay to fish for tuna. The results of this expedition will not be known for some time. (World Fishing, November 1959.)



Portugal

CANNED FISH EXPORTS, JANUARY-AUGUST 1959:

Portugal's exports of canned fish during January-August 1959, amounted to 43,349 metric tons (2,373,000 cases), valued at US\$22.3 million, as compared with 38,267 tons, valued at US\$20.4 million, for the same period in 1958. Sardines in olive oil exported during the first eight months of 1959 totaled 31,294 tons, valued at US\$15.1 million.

Portuguese Canned Fish Exports, January-August 1959		
Species	Metric Tons	US\$ 1,000
Sardines in olive oil	31,294	15,116
Sardine & sardinelike fish in brine	1,095	221
Tuna & tunalike fish in olive oil	2,499	1,784
Anchovy fillets	4,166	3,094
Mackerel in olive oil	2,605	1,283
Other fish	1,690	765
Total	43,349	22,263

During January-August 1959, the leading canned fish buyer was Germany with 9,494 tons (valued at US\$4.7 million), followed by Italy with 6,300 tons (valued at US\$3.6 million), United States with 4,133 tons (valued at US\$2.9 million), Great Britain with 3,732 tons (valued at US\$1.7 million), and Belgium-Luxembourg with 2,751 tons (valued at US\$1.3 million). Exports to the United States included 1,731 tons of anchovies, 586 tons of tuna, 1,725 tons of sardines, and 29 tons of mackerel. (Conservas de Peixe, October 1959.)

CANNED FISH PACK, JANUARY-AUGUST 1959:

The total pack of canned fish for January-August 1959 amounted to 25,290 metric tons as compared with 26,336 tons for the same period in 1958. Canned sardines in oil (15,667 tons) accounted for 61.9 percent of the January-August

Portuguese Canned Fish Pack, January-August 1959		
Product	Metric Tons	1,000 Cases
<u>In Olive Oil:</u>		
Sardines	15,667	824
Sardinelike fish	541	28
Anchovy fillets	4,008	400
Tuna	3,864	138
Mackerel	406	16
Other species	804	42
Total	25,290	1,448
1/Net weight.		

gust 1959 total pack, up by 8.3 percent from the pack of 14,468 tons for the same period of 1958, the October 1959 Conservas de Peixe reports.

COD FISHING FLEET HAD POOR SEASON:

By early November 1959 the Portuguese cod fishing fleet has returned from the fishing grounds off Newfoundland and Greenland and confirmed earlier reports of a poor catch. The Delegate of the Portuguese Ministry of Marine, who accompanied the fleet, stated that the yield per hour of trawling in the Greenland area has declined from 4.19 metric tons in 1955 to 2.45 metric tons at present. The catches of the trawl-line vessels declined from about 4.13 tons to 2.79 tons per hour fishing per vessel. The drop in the catch per unit of effort is causing grave concern to the Portuguese cod fishing industry, the United States Embassy in Lisbon reported on November 19, 1959.

FISHERIES TRENDS, JANUARY-AUGUST 1959:

Sardine Fishing: During January-August 1959, the Portuguese fishing fleet landed 45,242 metric tons of sardines (valued at US\$4,696,590 ex-vessel, or about \$103.80 a ton).

August 1959 landings of sardines totaled 16,802 tons valued at US\$1,712,834. Canneries purchased 59.6 percent, or 10,019 tons, of the sardines (valued at US\$1,048,661 ex-vessel or about \$104.67 a ton) during August 1959. A total of 6,770 tons was purchased for the fresh fish market, and 3 tons were salted.

Other Fishing: The January-August 1959 landings of fish other than sardines were principally 19,591 tons of chinchards (value US\$1,334,087) and 3,031 tons of anchovies (value US\$276,522). (Conservas de Peixe, October 1959.)

FISHERY LANDINGS IN PORTUGAL, MADEIRA, AND THE AZORES, 1958:

Landings of fish and shellfish (exclusive of the whale and cod fisheries) in Portugal, Madeira, and the Azores in

Portugal (Contd.):

1958 amounted to 275,223 metric tons (about 606.8 million pounds), valued at

112,554 tons landed in 1957. However, the landed value of sardines in 1958 was down sharply (about \$88.39 a metric ton as compared with \$115.93 a ton in

Table 1 - Landings of Fish and Shellfish in Portugal, Madeira, and Azores, 1957 and 1958

	1958			1957		
	Quantity	Value		Quantity	Value	
	Metric Tons	1,000 Escudos	US\$ 1,000	Metric Tons	1,000 Escudos	US\$ 1,000
Portugal:						
Fish:						
Tuna & similar	2,475	12,192	427	1,909	10,580	368
Anchovy & sprat	13,332	28,720	1,005	7,499	38,146	1,327
Spanish & common mackerel	7,846	14,819	519	16,600	27,361	952
Chinchards	39,636	88,425	3,095	39,762	85,907	2,988
Corvina	1,375	9,075	318	957	6,878	239
Sardines	131,088	331,096	11,588	112,554	375,151	13,049
Cachucho & besugo	6,098	24,093	843	6,019	19,672	684
Pargo & common sea bream	10,506	48,418	1,695	11,519	56,555	1,967
Scabbardfish	2,614	14,358	503	1,673	8,999	313
Whiting	14,739	128,476	4,497	11,885	110,410	3,840
Other	25,853	134,070	4,692	28,895	146,194	5,055
Total fish	255,562	833,742	29,182	239,272	885,853	30,812
Shellfish:						
Crabs, lobsters, & other crustaceans	780	17,769	622	1,420	20,732	721
Squid	833	5,551	194	956	6,404	223
Cuttlefish	1,663	7,123	249	1,509	6,462	225
Octopus	697	4,644	163	650	4,741	165
Oysters	869	263	9	491	160	6
Other mollusks	1,939	1,449	51	2,331	1,697	59
Total shellfish	6,781	36,799	1,288	7,357	40,196	1,399
Fresh-water fish	533	3,671	128	536	4,817	167
Total Portugal	262,876	874,121	30,598	247,165	930,866	32,378
Madeira:						
Fish:						
Tuna & similar	1,154	5,018	176	2,747	10,243	356
Spanish mackerel	528	1,300	46	508	1,242	43
Chinchards	620	1,745	61	452	1,275	44
Pargo & common sea bream	-	-	-	32	207	7
Scabbardfish	694	3,768	132	877	3,683	128
Other	489	2,578	90	949	1,721	60
Total fish	3,185	14,409	505	5,565	18,371	638
Shellfish	17	53	2	16	46	2
Total Madeira	3,502	14,462	507	5,581	18,417	640
Azores:						
Fish:						
Tuna & similar	2,824	5,544	194	5,511	12,898	449
Spanish mackerel	273	615	22	402	1,006	35
Chinchards	3,764	4,502	158	3,677	5,125	178
Sardines	1/	1/	1/	286	884	31
Besugo	1/	1/	1/	10	67	2
Pargo & common sea bream	1/	1/	1/	24	102	4
Other	1,934	6,673	234	1,123	4,513	157
Total fish	8,795	17,334	608	11,033	24,595	856
Shellfish:						
Crabs, lobsters, & other crustaceans	22	589	21	21	542	19
Squid, octopus, and other mollusks	28	172	6	5	5	2
Total shellfish	50	761	27	26	547	21
Total Azores	8,845	18,095	635	11,059	25,192	877
Grand Total: Portugal, Madeira, and Azores	275,223	906,769	31,740	263,805	974,475	33,935

Note: Values converted at rate of 1,000 escudos equal US\$35.
 1. Values less than US\$500.

US\$31.7 million. The 1958 landings were up about 4.3 percent in quantity from the 263,805 tons (about 581.6 million pounds) landed in 1957, but dropped in value by 6.9 percent from the 1957 value of US\$33.9 million. Sardine landings in Portugal in 1958 of 131,088 tons were higher by 16.5 percent from the

1957) from the preceding year and reflected the slump in world markets for many canned fish products in 1958.

Note: Also see Commercial Fisheries Review, May 1959, p. 73.

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Portugal (Contd.):

**SARDINE LANDINGS NEAR
RECORD IN 1959:**

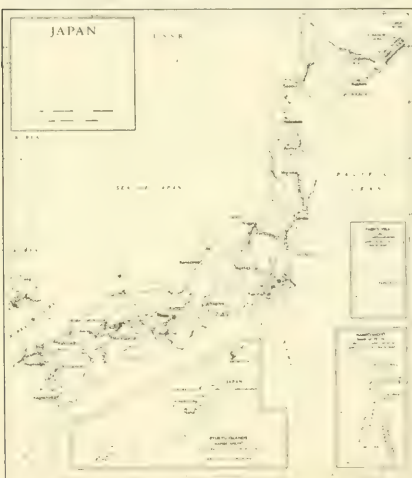
During the fall of 1959 catches of sardines were good and the Portuguese canneries were active. After a late start, sardine landings improved and the total landings for 1959 will be close to a record. Landings of sardines during the last 15 days of October amounted to 14,150 metric tons, valued at about US\$1,127,000.

Exports of canned fish were good, but due to a shortage of tinplate, stocks on hand were declining as of November, the United States Embassy in Lisbon reported on November 19, 1959.

**Ryukyu Islands****LANDINGS AND IMPORTS, 1958:**

Fishery landings in 1958 in the Ryukyu Islands amounted to 15,786 short tons, excluding 7,785 tons of skipjack tuna.

Many Japanese vessels now exploit productive East China sea-fishing grounds within 250 miles of Okinawa. These fish are taken to Japan, then



shipped back to the Ryukyus for consumption in frozen or processed form.

Imports in 1958 totaled 8,121 short tons, valued at ¥\$2.3 million, as follows: frozen, 2,617 tons; dried and salted, 1,628 tons; dried skipjack sticks, 191 tons; canned fish, 3,685 tons. (Foreign Commerce Weekly, November 2, 1959.)

**Spain****VIGO FISHERIES TRENDS,
JULY-SEPTEMBER 1959:**

Fish Exchange: Landings at the Vigo, Spain, Fish Exchange for the third quarter of 1959 totaled 21,636 metric tons, or 5,165 tons more than the second quarter of 1959 and 3,855 tons more than the same quarter of 1958. The value of landings during July-September 1959 at the Exchange totaled US\$3,723,000 (calculated at the current rate of exchange of 80 pesetas to the dollar), a decrease in dollar value from the previous quarter of about 10 percent, and about 22 percent below the same quarter of 1958.

Hake, small hake, and horse mackerel were the most plentiful species landed in the July-September 1959 period, and in total the most valuable. The albacore tuna season, that began favorably in June and July with landings running well ahead of those for 1958, finished the third quarter at a slightly lower level than for the same period of 1958 (4,230 tons as compared with 4,567 tons).

Sardine landings, after a slow start in June and July, were more plentiful in August and especially in September than they had been in several years. The catch for the quarter totaled 5,574 tons as compared with 2,011 tons for the same quarter of 1958.

Fish Canning and Processing: Fish bought for canning during the third quarter from the Vigo Fish Exchange reached the seasonal peak at 6,575 tons, an increase of 4,919 tons over the second quarter of 1959, and 880 tons more than the third quarter of 1958. Production of fish meal and other byproducts rose from 2,314 tons during the second quarter to 3,467 tons for the July-September quarter, and an increase of 1,685 tons over the third quarter of 1958.

Increased purchases at the Exchange by the canning industry reflect the adequate supply of albacore and the increased availability of sardines over 1958. The low price paid for albacore early in the season did not hold as canners' demand for albacore increased. The average price per kilo paid in September was 14.92 pesetas (about 11.3 U. S. cents a pound or US\$226 a short ton).

The substantially increased purchases of fish for the by-products industry reflected an attempt by the fish meal industry to meet internal consumption needs, a fourth of which was estimated to have been met in 1958 through imports. As reported previously, import licenses for fish meal imports are not being granted until the National Fisheries Syndicate certifies that national production cannot meet demand. In addition, the processors have been able to purchase large quantities of sardines of inferior quality not suitable for canning, raw material which had previously been lacking, the United States Consul in Vigo, Spain, reported on October 13, 1959.

Note: Exchange rate for Spanish peseta was changed from 42 pesetas per US\$1 on July 1, 1959.



Sweden

HERRING EXPORT AGREEMENT REACHED WITH CZECHOSLOVAKIA:

The Swedish west coast fish organization, which handles the export of fish from the west coast of Sweden to Communist countries, has entered into an agreement with Czechoslovakia calling for immediate delivery of 350 metric tons of frozen herring and 500 tons of winter herring to be delivered in January 1960. (United States Consulate in Goteborg, December 1, 1959.)

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HERRING SALES TO EAST AND WEST GERMANY INCREASE:

Swedish exports of herring to East Germany of about 4,500 metric tons that accumulated in cold storage plants during a temporary export stop to East Germany (ended late in October) were completed about the end of November 1959, according to a Swedish west coast fishermen's organization.

A spokesman for the organization describes the fall 1959 demand for herring in East Germany as good and sales presented no difficulties. The only problem was catching the fish.

Swedish herring was also in very good demand in West Germany where high prices were being paid. This encouraged Swedish fishermen, who operate large trawlers, to proceed to Cuxhaven when fully loaded and land their herring direct.

The reason for the large West German demand for herring is said to be a result of the poor herring catches made by the West German fishermen in the English Channel. Except for some bad weather during November which considerably reduced the Swedish herring catches off the Norwegian south-west coast at the Egersund Bank in the North Sea, the fishing there has been good. With the return of good weather later in November there were about 100 Swedish vessels fishing on the Egersund Bank, states a November 24, 1959, dispatch from the United States Consul in Goteborg.

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NEW FISHERY RESEARCH VESSEL PLANNED:

The keel of a new steel Swedish fishery research vessel was due to be laid at the beginning of 1960 at the naval yard at Karlskrona. It is expected it will be possible to deliver the vessel in the fall of 1960. Its main dimensions are as follows: length over-all 30.25 meters (99.2 feet); length between perpendiculars 25.50 meters (86.7 feet); breadth 6.40 meters (21.0 feet).

An official of the Swedish Fisheries Board in a press interview said that in addition to the vessel's survey duties it will also serve as a supply ship for herring fishermen in the North Sea.

Experimental handling and processing of fish will be part of the work of this vessel, and for that purpose there will be two fish holds. In this field collaboration has been established with the Swedish Institute for Preservation Research which cooperated in planning quick-freezing equipment.

The ship laboratories (one large one for biological and hydrographical examinations and one small one for bacteriological research) will be placed in the forepart of the superstructure on the main deck in order to obtain maximum use of daylight and ventilation. This location also has the advantage of minimum movement while at sea.

The new survey vessel will have two separate echo-sounding units constructed for different frequencies. The larger unit, comprising a recording echo-sounder, a magnifying glass, and a periphone, will be installed in the navigation cabin, and the smaller unit, comprising only a recording echo-sounder, will be located in the laboratory. Further, a marine radar, will be installed. (United States Consulate in Goteborg, November 30, 1959.)

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PLANT BEING BUILT TO MAKE FISH PROTEIN CONCENTRATE:

A plant for the manufacture of a protein product made from fish or fish waste and containing a food content consisting chiefly of albumen will be erected at Bua,

Sweden (Contd.):

a fishing village near Varberg, Sweden, according to a report in the Goteborg press. Production of the preparation is expected to commence early in 1960. From 12-15 persons will be employed in the manufacturing process at the out-set. The manager of the factory will be the Hungarian engineer who invented the process.

The product will be exported to underdeveloped countries through the Food and Agriculture Organization. (United States Consulate, Goteborg, November 17, 1959.)



Union of South Africa

EAST GERMANY AND YUGOSLAVIA PURCHASE FISH MEAL AND OIL:

The Chairman of the South African Fish Meal Producers Association returned to Cape Town in November 1959 from a 2½-month sales trip abroad and reported that he had obtained orders for fish meal and oil--US\$1,396,000 from East Germany and US\$698,000 from Yugoslavia. (United States Consulate, Pretoria, November 25, 1959.)

FROZEN FISH DEMAND GROWING:

A Union of South Africa firm has hired a frozen food expert to assist in the promotion of sales of all its frozen products.

It will be one of the expert's duties to tour the Union and possibly the Rhodesias advising retailers generally on the best way of handling frozen products, and of promoting rapid sales. His efforts are being backed by radio and newspaper advertising.

Among the new products recently put on the market by the firm are frozen breaded fish portions and frozen curried fish cakes, both of which are proving very popular with South African housewives.

Throughout Southern Africa in the past two years there has been a big swing towards frozen food products, and more and more products will reach the housewife in that form. (The South African Shipping News and Fishing Industry Review, October 1959.)

SEALING OPERATIONS:

From estimates of numbers on land, it is believed that the total number of seals of all ages inhabiting South African Cape rookeries does not exceed 50,000, one third of which are young animals, the South African Division of Fisheries reports. The term "Cape rookeries" is intended to cover those islands and rocks on which seals congregate--Elephant Rock, Jacob's Reef, Robbeteen, Duikerklip, Seal Island, Geyser Rock, and Quoin Rock.

A flourishing fur-sealing industry has been developed. The industry is mainly concerned with the export of raw pelts and has neglected the byproducts. The number of pelts taken during winter sealing has increased from 27,087 in 1950 to 37,317 in 1955.

So far the annual take of seals has prevented any large-scale recruitment to the adult classes and there is no special need to control the population on any basis other than the usual commercial one of annual killing for profit.

The report states that male seals are much larger than females, the former reaching a body weight of from 450 to 800 pounds, the latter fluctuating between 200 and 300 pounds. Young seals are seldom heavier than 100 pounds.

Seals are seldom found in large numbers at sea, small groups composed of two or three animals being most frequently encountered. Larger concentrations of seals occur only when prey is particularly abundant. Their food consists of fish, squid and crustaceans.

The remarkable growth of the Union's commercial fisheries obscures any impact that the seals may be having on re-

Union of South Africa (Contd.):

sources of small fish. It is considered unlikely that the seals compete seriously with modern fish techniques (electronic shoal-location and the use of lampara seine nets), nor do they affect the commercial catch to any great extent.

Where fishing grounds are artificially depleted, the seal, as a better organized predator, is able to compensate for lack of prey by adjusting its diet and hunting elsewhere. (*The South African Shipping News and Fishing Industry Review*, October, 1959.)

THREE PADDLE-WHEEL VESSELS BUILT FOR OYSTER-SHELL INDUSTRY:

Three of the most unusual vessels ever built in South Africa have been launched from a Cape Town shipyard. A shallow-draught dredger and two barges propelled by paddle wheels will

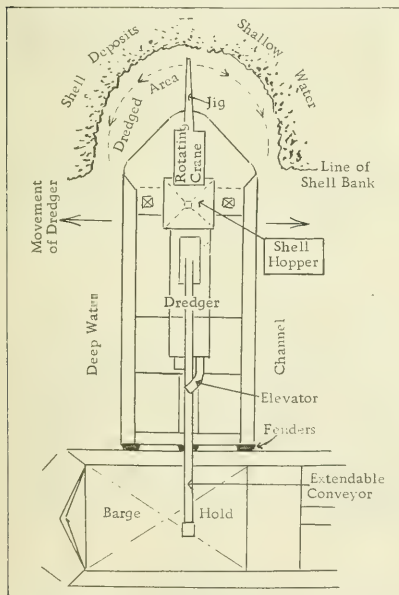


Fig. 1 - Side view of dredger digging oyster shells and loading them mechanically onto the barge, which will take them to the plant.

gather oyster shells from a deposit estimated at tens of millions of tons in the Langebaan Lagoon.

Behind this vast deposit lies one of the great marine mysteries of the Cape West Coast. Some time in this lagoon extension of Saldanha Bay, many years ago a species of red oysters, *Ostrea atherstonei*, thrived and abounded in countless millions. This species can still be found in small quantities on the Cape coast, but some change in water temperature or silting killed it off in the Langebaan Lagoon.

The oyster shells of Langebaan--in a 16 square mile area, 30 and more feet deep--form one of the largest known deposits in the world, approached in extent only by a deposit in Denmark and another in Chesapeake Bay in the United States.

The Langebaan shells have been gathered for 50 years and more, but their real value has only been realized in the past 7 or 8 years.

The shell beds, about six miles up the lagoon, are large flat deposits covered by a thin layer of silt and intersected by channels. They have been worked by a 90-year old converted lighter, which gathers the shells for washing and sun-drying ashore. These shells are then crushed and the grit and powder is despatched in hessian bags.

Production has reached 300 tons a month, all of it sold in the Union. This will now be stepped-up to 2,000 tons a month to meet all local requirements and perhaps also leave a surplus for export abroad where the market, like the Langebaan deposit, is almost unlimited.

To increase production, the South African firm is re-equipping its oyster-shell business. In addition to the three paddle-wheel vessels, a new factory was erected.

The two barges, which were launched last in September, are flat-bottomed vessels of welded steel construction. They have flat plate and cone section hulls, are each 58 ft. long, 21 ft. 4 in. wide, 5 ft. deep, and are designed to op-

Union of South Africa (Contd.):

erate in only 2 ft. 8 in. of water. Self-trimming vessels, they are designed to maintain an even keel while loading and carrying shells fed from the dredger. Each barge is equipped with two paddle wheels.

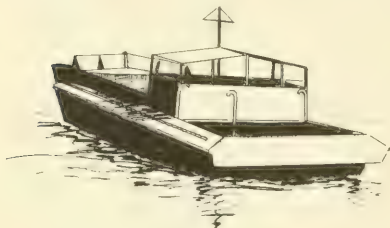


Fig. 2 - Wide-beamed 58-foot long paddle-wheel barge with shallow draft used for loading and carrying oyster shells in South Africa.

Each barge will carry 56 tons of shells in 24 containers measuring 4 ft. by 4 ft. by 6 ft. 6 in. Two types of container will be tried, one of metal framing with wire mesh to allow the shells to drip and one of solid plate with perforated plate bottom also to permit drip. These containers will be carried in a spacious hold 16 ft. 9 in. wide by 25 ft. 1 in. long.

The barges are utility craft. Buoyancy will be maintained by a watertight forepeak, a watertight compartment below the simple wheelhouse, and by watertight compartments aft around the two paddles.

The barges will probably be crewed by one man, who may be assisted by crew carried to and from the dredger.

This dredger, which is 51 ft. long, is similar in basic design and construction to the barges, but has a closed engine-room, raised bridge, and spacious accommodation for the crew.

The main paddle drive will be by a 40 hp. electric motor through double chain reduction with a tramway controller on the bridge. But the dredger's paddles are for auxiliary movement only as she will warp her way across the oyster beds and will only use them for

occasional movements to other beds, to and from the factory jetty, or for trotting her moorings. Thus the main function of the engine will be to generate electricity for motors driving the dredging plant and for lighting.

Dredging of the beds will be by a grab bucket dredging crane, mounted on the foredeck. This crane will have a 20-ft. boom and all-round revolving slewing gear. The receiving hopper of the dredger is arranged so that, when slewing from dredging, the crane will not have to luff.

From the grab bucket the shell will fall into a hopper and from this into a three-stage vibrating shell-washing plant below deck, which will remove sand and other foreign matter. After washing, the shell will be lifted in stainless steel buckets and fed through a telescopic chute aft down to the containers in the barge.

It is planned that initial recovery will be 56 tons of shell in an eight-hour working day. While the dredger works into the beds, the barge will lie aft receiving the shells through the chute. In the meantime the other barge will be discharging at the factory dock. At about 3 p.m. each day this barge will leave the jetty arriving at the dredger an hour later.

The full barge will arrive at the dock about 5 p.m. and will stand all night to allow the shells to drip dry into the bilges. The next morning the dock crane will unload the vessel and replace the empty containers. A second stage would be to increase the dredging crane rate so that the barges change twice a day.

Containers will be emptied on the dock into a slow-moving slat conveyor 14 ft. wide which will in turn feed the first shore plant bucket elevator at the entrance to the factory building. From the elevator the shell will be fed to four shell-louvred steel drying bins, each with a capacity of 56 to 60 tons. This will enable each load from the dredger to stand drying for four days before processing.

The bins will discharge to a bucket-conveyor elevator which will feed a hammer mill crusher. From this crusher the shell grit and powder will go to over-

Union of South Africa (Contd.):

head sieve screens which will divide it into grit, fines, and powder. Large-size overtailings will be returned by spout to the crusher feed.

Crushed and sorted shell will be piped to grading bins for feeding to the automatic packing and weighing machines below. These machines will pack it into paper valve bags, each containing 100 pounds of shell grit, fines, or powder.

A feature of the factory and dredging plant is that all conveyors, elevators, chains, elevator and conveyor sections, and electric motor drives will be identical and interchangeable. (The South African Shipping News and Fishing Industry Review, October 1959.)

* * * * *

WHALING LAND STATION SEASON IN 1959 SUCCESSFUL:

The Union of South Africa's 1959 off-shore whaling season off the Natal and Zululand coasts (East Africa) extended from mid-April to mid-October 1959. During the season 1,829 whales were caught and yielded 6,285 long tons of whale oil, slightly more than 3,800 long tons of sperm oil, 71,000 short tons of whale meal, and 345 short tons of whale meat extract. As compared with the 1958 season production in 1959 increased by about 100 tons of whale oil and the yield of whale meal and extract was substantially higher.

The South African whaling firm experimented in 1959 with asdic equipment fitted to one catcher and utilized aircraft for spotting and plotting purposes. The firm is more than satisfied with the results of these innovations, but it is doubtful that next season will see an increase in this type of equipment. It is believed that it will take two years of comparison to convince the conservative management that asdic should be fitted to all catchers of the whaling fleet. (United States Consul in Durban, December 1, 1959.)



U. S. S. R.

GOOD FISHING GROUNDS FOUND IN DAVIS STRAIT OFF WEST GREENLAND:

Rich fishing grounds off the coast of West Greenland in Davis Strait have been discovered by the Soviet fisheries research vessel Muksun. The 400-mile stretch from Cape Farewell on the southern tip of Greenland to Disco Island on the west coast has been found to abound in cod, ocean perch, wolffish, and flounders.

The Muksun, whose catch on some days exceeded 12 metric tons, reported that the new grounds could be fished by all types of fishing vessels.

Purpose of the expedition undertaken by the Muksun, which carried scientists from the Baltic Sea Fisheries and Oceanographic Research Institute, was to map the ocean bed and concentrations of fish with a view to obtaining the most efficient trawling operations and improving techniques.

The maps prepared by the Muksun's oceanographers, it is expected, will help fishermen of many countries in exploiting the rich fisheries off the coasts of Greenland. (World Fishing, November 1959.)

* * * * *

TUNA FISHING IN THE PACIFIC OCEAN INITIATED:

The Soviet Union has begun its first trial fishing for tuna in the Pacific Ocean, according to a report in Fiskets Gang (November 12, 1959), a Norwegian fishery trade periodical. The original news item appeared in Leningradskaja Pravda (October 18).

The first Russian specially-built long-line vessel for tuna fishing left port early in the fall of 1959. The 800-ton vessel has a Diesel motor of 600 hp. It is 151 feet long and almost 30 feet in breadth, and is equipped with special winches and fishing gear consisting of 74.6 miles of long line. The vessel can remain at sea for two months and has a crew of 25.

U. S. S. R. (Contd.):

In all there are 12 tanks on the vessel calculated to hold 120 metric tons of tuna plus freezer space. Two of the tanks are for the livers of sharks, which are often taken on the tuna lines.

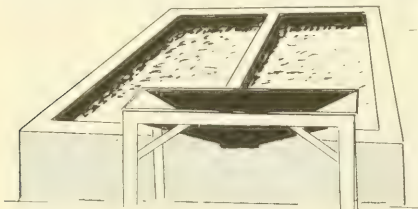


United Kingdom

CONTAMINATION IN OYSTERS ERADICATED BY NEW TREATMENT:

The British health authorities are permitting the sale of oysters harvested from suspected contaminated areas provided the shellfish are cleansed in tanks in accordance with the Ministry of Agriculture and Fisheries Laboratory's recommendations. A number of British oyster planters have installed and are operating cleansing tanks.

The largest cleansing plant is in West Mersea. The plant consists of three double 20 feet by 5 feet by 2 feet 6 inches reinforced concrete tanks laid side by side, with two sheds for housing water-circulating pumps, ultraviolet lamp batteries, weir tanks, and cascade towers.



Double reinforced concrete tank capable of treating 10,000 oysters at one time.

These and all the auxiliary equipment necessary to operate the plant--trays for the oysters, bagging equipment, and pumps and hoses for refilling the tanks--are enclosed by a 6-foot wooden fence. The plant covers some 400 square yards and costs between £1,500 and £2,000 (US\$4,200-5,600).

Oysters are brought into the enclosure in baskets and are carefully tipped (so that none of them are damaged) on to a clean concrete surface at the head of the tanks. There they are given a

thorough washing to remove all the mud. Then they are placed in 5 feet by 2 feet wood framed trays with wire netting at the bottom--500 to a tray, no more.

The trays are placed in the treatment tanks which have already been filled with clean sea water. Each double tank will hold 20 trays; so that the total number of oysters that can be treated simultaneously in that plant is 30,000.

Water is then circulated by the pumps installed in the sheds. It is drawn from the bottom of the tanks through pipes into overhead tanks in the sheds. In the tanks it passes at a very shallow depth over a weir and under ultraviolet lamps. Then it is carried to cascade towers in which it drops some 3 or 4 feet and is aerated in the process.

From the towers it is led back to large diameter pipes running round the top edges of the treatment tanks. From small diameter branch pipes, fitted at intervals in the large one, the water spurts upwards and inwards--for oxygenation--back into the tanks.

After 48 hours in the treatment tanks, the oysters are completely cleansed. They then have to be lifted from the trays and bagged for transport to market. (*The Fishing News*, October 16, 1959.)



Venezuela

JAPANESE-VENEZUELAN TUNA FISHING OPERATIONS IN CARIBBEAN:

The joint fishing venture in Caribbean waters by Japanese and Venezuelan interests is popular in Venezuela, according to a report from Japan. Two Japanese long-liners have been fishing in the Caribbean under an agreement between the Chiba Prefecture Fisheries Promotion Company of Japan and Venezuelan interests. The Japanese invested 49 percent and the Venezuelans 51 percent in the joint undertaking and Chiba Prefecture has supplied the two 85-ton fishing vessels and crews. The Prefecture is said to have agreed to construct two more fishing boats at a cost of US\$222,222

Venezuela (Contd.):

with construction scheduled to begin by the end of 1959.

The Venezuelans report that demand for tuna caught by the Japanese is heavy and steadily growing.

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TUNA VESSELS FISHING OFF BRITISH WEST INDIES:

Several Venezuelan fishing vessels, from 60-80 feet over-all length, are fish-

ing for tuna about 15 miles southwest of the British West Indies Island of Grenada. According to the West Indies Fisheries Bulletin of September/October 1959, the tuna are iced aboard the vessels and landed in Venezuela. Catches are reported to average 50 tuna a day per boat, with occasional daily catches of 100 tuna.



WHALE'S TEMPERATURE AND HEART BEAT RECORDED

Two Woods Hole scientists obtained a cardiogram and temperature observations of a 45-foot whale early in December 1959. For years scientists have tried vainly to obtain such information of the largest existing animals.

A marvelous opportunity occurred when a 50-ton male finwhale beached at Provincetown, Mass., on the tip of Cape Cod and stayed alive for several hours. Warned by a Woods Hole observer, Dr. John W. Kanwisher of the Woods Hole Oceanographic Institution and Dr. Alfred W. Senft of the Marine Biological Laboratory hastily collected equipment and took the measurements until shortly before the whale died.

The cardiograms showed a pulse beat of 25 per minute (human--72 per minute) and the estimated relative size of the heart as about 500 pounds, compared to some 250 grams (8.8 ounces) for a human heart. Dr. Senft also determined how the heart sits in the chest and the time interval from the pacemaker of the heart to the contraction of the ventricle. The electrodes necessary to measure the small electric currents which occur in connection with the contraction of the heart muscle were improvised by Senft by using some sharpened welding rods. These were stuck some 8 inches through the whale's blubber in positions similar to those used for a human cardiograph. The observed voltages did not differ markedly from those of man's heart, despite the size differences. Of course, it must be kept in mind that the beached whale was not a particularly happy one.

As the whale's condition deteriorated there were changes in the cardiogram not unlike those seen in humans when the oxygenation is impaired. It appeared that the whale suffered a conduction block, a common defect in man's heart.

While the cardiograms were made, Kanwisher obtained temperature measurements and collected respiration samples from the whale's blowhole. Kanwisher has worked for years on the temperature regulation of animals and has worked on questions such as: "How does a whale keep warm in polar seas" and "how does he lose heat when swimming fast"? A whale has no sweat glands and cannot take its overcoat (blubber) off. As in the case of the heartbeat of the large whales, observations have been unsuccessfully tried for years.

The Provincetown whale had an internal body heat of 92° F., while the fins and tail had a temperature of 50° F. Initially, the dorsal fin (used as a radiator) was much warmer.

Gas samples taken from the whale's breath showed that the animal's lungs were not functioning well. The whale extracted only one-third as much oxygen from the inhaled air as humans do.

The heart specialist Dr. Paul Dudley White, who has spent much time and effort to obtain cardiograms of large whales, was informed of the successful observations and offered to give his opinion on the records. Accordingly, Senft and Kanwisher met White in Boston, together with a representative of an instrument manufacturing company. It was emphasized that the obtained information is but one phase in a continuing program of observations and that much more work remains to be done. Accordingly, a program was initiated to make future plans for an expedition and to determine what sort of equipment should be readily available to prevent on the spot improvisation.



FEDERAL ACTIONS

Department of Health, Education, and Welfare

FOOD AND DRUG ADMINISTRATION

LIST OF FOOD ADDITIVES GENERALLY RECOGNIZED AS SAFE ISSUED:

A list of food additives or substances generally recognized as safe appeared in an order issued by the U. S. Food and Drug Administration and published in the

Federal Register of November 20, 1959. The order became effective on December 20, 1959.

The order also points out that inclusion of substances as nutrients does not constitute a finding that the substance is useful as a supplement to the human diet.

The order as it appeared in the Federal Register follows:

Title 21—FOOD AND DRUGS

Chapter I—Food and Drug Administration, Department of Health, Education, and Welfare

SUBCHAPTER B—FOOD AND FOOD PRODUCTS

PART 121—FOOD ADDITIVES

Subpart B—Exemption of Certain Food Additives From the Requirement of Tolerances

SUBSTANCES THAT ARE GENERALLY RECOGNIZED AS SAFE

Pursuant to the authority vested in the Secretary of Health, Education, and Welfare by the Federal Food, Drug and Cosmetic Act (secs. 409, 701, 72 Stat. 1785, 52 Stat. 1055, as amended 72 Stat. 948; 21 U.S.C. 348, 371), and delegated to the Commissioner of Food and Drugs by the Secretary (23 F.R. 9500), and after having considered all comments on the proposed order published in the Federal Register of December 9, 1958 (23 F.R. 9511), containing a list of substances regarded as generally recognized as safe within the meaning of section 409 of the act, the Commissioner has concluded that the substances in that list with the exception of carbon black, charcoal, oleic acid, linoleic acid, titanium dioxide, and ultramarine blue, are generally recognized as safe. *Therefore, it is ordered*, That the food additive regulations (21 CFR Part 121 (24 F.R. 1095)) be amended by adding thereto, under Subpart B, the following new section:

§ 121.101 Substances that are generally recognized as safe.

(a) It is impracticable to list all substances that are generally recognized as safe for their intended use. However, by way of illustration, the Commissioner regards such common food ingredients as salt, pepper, sugar, vinegar, baking powder, and monosodium glutamate as safe for their intended use. The lists in para-

graph (d) of this section include additional substances that, when used for the purposes indicated, in accordance with good manufacturing practice, are regarded by the Commissioner as generally recognized as safe for such uses.

(b) For the purposes of this section, good manufacturing practice shall be defined to include the following restrictions:

(1) The quantity of a substance added to food does not exceed the amount reasonably required to accomplish its intended physical, nutritional, or other technical effect in food; and

(2) The quantity of a substance that becomes a component of food as a result of its use in the manufacturing, processing, or packaging of food, and which is not intended to accomplish any physical or other technical effect in the food itself, shall be reduced to the extent reasonably possible.

(3) The substance is of appropriate food grade and is prepared and handled as a food ingredient. Upon request the Commissioner will offer an opinion, based on specifications and intended use, as to whether or not a particular grade or lot of the substance is of suitable purity for use in food and would generally be regarded as safe for the purpose intended, by experts qualified to evaluate its safety.

(c) The inclusion of substances in the list of nutrients does not constitute a finding on the part of the Department that the substance is useful as a supplement to the diet for humans.

(d) Substances that are generally recognized as safe for their intended use within the meaning of section 409 of the act are as follows:

CHEMICAL PRESERVATIVES

Ascorbic acid.
Ascorbyl palmitate.
Calcium ascorbate.
Calcium propionate.
Erythorbic acid.
Potassium sorbate.
Propionic acid.

Sodium ascorbate.
Sodium propionate.
Sodium sorbate.
Sorbic acid.
Tocopherols.

BUFFERS AND NEUTRALIZING AGENTS

Acetic acid.
Aluminum ammonium sulfate.
Aluminum sodium sulfate.
Aluminum potassium sulfate.
Ammonium bicarbonate.
Ammonium carbonate.
Ammonium hydroxide.
Ammonium phosphate (mono- and di-

basic).
Calcium carbonate.
Calcium chloride.
Calcium citrate.
Calcium gluconate.
Calcium hydroxide.
Calcium lactate.
Calcium oxide.
Calcium phosphate.
Citric acid.
Lactic acid.
Magnesium carbonate.
Magnesium oxide.
Potassium acid tartrate.
Potassium bicarbonate.
Potassium carbonate.
Potassium citrate.
Potassium hydroxide.
Sodium acetate.
Sodium acid pyrophosphate.
Sodium aluminum phosphate.
Sodium bicarbonate.
Sodium carbonate.
Sodium citrate.
Sodium hydroxide.
Sodium phosphate (mono-, di-, tri-).
Sodium potassium tartrate.
Sodium sesquicarbonate.
Sulfuric acid.
Tartaric acid.

EMULSIFYING AGENTS

Diacetyl tartaric acid esters of mono- and diglycerides from the glycerols of edible fats or oils.
Mono- and diglycerides from the glycerols of edible fats or oils.
Monosodium phosphate derivatives of mono- and diglycerides from the glycerols of edible fats or oils.
Propylene glycol.

MISCELLANEOUS

Acetic acid.
Aluminum sodium sulfate.
Aluminum sulfate.
Butane.
Calcium phosphate, tribasic.
Caramel.
Carbon dioxide.
Carinauba wax.
Citric acid.
Glycerin.
Glycerol monostearate.
Helium.
Magnesium carbonate.
Magnesium hydroxide.
Monoammonium glutamate.
Nitrogen.

Papain.
Phosphoric acid.
Propane.
Propylene glycol.
Triacetin (glyceryl triacetate).
Tricalcium phosphate.
Sodium carbonate.
Sodium phosphate.
Sodium tripolyphosphate.

NONNUTRITIVE SWEETENERS

Calcium cyclohexyl sulfamate.
Calcium saccharin.
Saccharin.
Sodium cyclohexyl sulfamate.
Sodium saccharin.

NUTRIENTS

Ascorbic acid.
Calcium carbonate.
Calcium oxide.
Calcium pantothenate.
Calcium phosphate (mono-, di-, tribasic).
Calcium sulfate.
Carotene.
Ferric phosphate.
Ferric pyrophosphate.
Ferric sodium pyrophosphate.
Ferrous sulfate.
Iron, reduced.
L-Lysine monohydrochloride.
Niacin.
Nicotinamide.
D-Pantothenyl alcohol.
Potassium chloride.
Pyridoxine hydrochloride.
Riboflavin.
Riboflavin-5-phosphate.
Sodium pantothenate.
Sodium phosphate (mono-, di-, tribasic).
Thiamine hydrochloride.
Thiamine mononitrate.
α-Tocopherol acetate.
Vitamin A.
Vitamin A acetate.
Vitamin A palmitate.
Vitamin B₁.¹
Vitamin B₂.¹
Vitamin D₂.

SEQUESTRANTS

For the purpose of this list, no attempt has been made to designate those sequestrants which may also function as chemical preservatives)

Calcium acetate.
Calcium chloride.
Calcium citrate.
Calcium diacetate.
Calcium gluconate.
Calcium hexametaphosphate.
Calcium phytate.
Citric acid.
Dipotassium phosphate.
Disodium phosphate.
Monocalcium acid phosphate.
Monosodium citrate.
Potassium citrate.
Sodium acid phosphate.
Sodium citrate.
Sodium diacetate.
Sodium gluconate.
Sodium hexametaphosphate.
Sodium metaphosphate.
Sodium phosphate (mono-, di-, tribasic-).
Sodium potassium tartrate.
Sodium pyrophosphate.
Sodium tartrate.
Sodium tetrapyrophosphate.
Sodium tripolyphosphate.
Tartaric acid.

STABILIZERS

Agar-agar.
Carob bean gum (locust bean gum).
Carrageenin.
Gum gumar.

Effective date. This order shall become effective 30 days from the date of its publication in the **FEDERAL REGISTER**. (Sec. 701, 52 Stat. 1055, as amended; 21 U.S.C. 371. Interprets or applies sec. 409, 72 Stat. 948; 21 U.S.C. 348)

Dated: November 13, 1959.

[SEAL] GEO. P. LARRICK
Commissioner of Food and Drugs.

Product	Tolerance	Specific uses or restrictions
ANTICAKING AGENTS		
Aluminum calcium silicate.....	2 percent.....	In table salt.
Calcium silicate.....	5 percent.....	In baking powder.
Calcium silicate.....	2 percent.....	In table salt.
Magnesium silicate.....	do.....	Do.
Tricalcium silicate.....	do.....	Do.
CHEMICAL PRESERVATIVES		
Benzoic acid.....	0.1 percent.....	Total content of antioxidants not over 0.02 percent of fat or oil content, including essential (volatile) oil content of the food.
Butylated hydroxyanisole.....	do.....	In cheese wraps.
Butylated hydroxytoluene.....	do.....	In edible fats or oils.
Cerilic acid.....	Total content of antioxidants not over 0.02 percent of fat or oil content, including essential (volatile) oil content of the food.	
Dibutyl thiodypyromate.....	0.1 percent (equivalent antioxidant activity 0.01 percent).	Total content of antioxidants not over 0.02 percent of fat or oil content, including essential (volatile) oil content of the food.
Gum guaiac.....	0.1 percent (equivalent antioxidant activity 0.01 percent).	Total content of antioxidants not over 0.02 percent of fat or oil content, including essential (volatile) oil content of the food.
Nordihydroguaiacetic acid.....	0.1 percent (equivalent antioxidant activity 0.01 percent).	Total content of antioxidants not over 0.02 percent of fat or oil content, including essential (volatile) oil content of the food.
Potassium bisulfite.....	do.....	Not in meats or in food recognizable as a source of vitamin B ₁ .
Potassium metabisulfite.....	do.....	Do.
Propyl gallate.....	Total content of antioxidants not over 0.02 percent of fat or oil content, including essential (volatile) oil content of the food.	
Sodium benzoate.....	0.1 percent.....	Not in meats or in foods recognizable as a source of vitamin B ₁ .
Sodium bisulfite.....	do.....	Do.
Sodium metabisulfite.....	do.....	Do.
Sodium sulfite.....	do.....	Do.
Sulfur dioxide.....	do.....	Do.
Thiodipropionate acid.....	Total content of antioxidants not over 0.02 percent of fat or oil content, including essential (volatile) oil content of the food.	
EMULSIFYING AGENTS		
Cholic acid.....	0.1 percent.....	Dried egg whites.
Desoxycholic acid.....	do.....	Do.
Glycolic acid.....	do.....	Do.
Oil bile extract.....	do.....	Do.
Tauracholic acid (or its sodium salt).....	do.....	Do.
MISCELLANEOUS		
Caffeine.....	0.02 percent.....	In cola type beverages.
Ethyl formate.....	0.0015 percent.....	As fumigant for cashew nuts.
Magnesium stearate.....	do.....	As migratory substance from packaging materials when used as a stabilizer.
Sorbitol.....	7.0 percent.....	In foods for special dietary use.
Triethyl citrate.....	0.25 percent.....	Egg whites.
NUTRIENTS		
Copper gluconate.....	0.005 percent.....	In table salt as a source of dietary iodine.
Cuprous iodide.....	0.01 percent.....	Do.
Potassium iodide.....	do.....	Do.
SEQUESTRANTS¹		
Isopropyl citrate.....	0.02 percent.....	In salt.
Sodium thiosulfate.....	0.1 percent.....	
Sucaryl citrate.....	0.15 percent.....	

¹ For the purpose of this list no attempt has been made to designate those sequestrants which may also function as chemical preservatives.

WARNING ISSUED ON USE OF TERM "CHOLESTEROL" IN LABELING OF COMMON FOODS:

Addition of unsaturated fats and oils to the otherwise unchanged ordinary diet will not reduce blood cholesterol and prevent heart attacks and strokes, the Food and Drug Administration announced on December 10, 1959. Representations to the public that salad oils, shortenings, oleomargarine, and similar products have value for these purposes are false and misleading and will cause such products to be misbranded, according to a statement of law-enforcement policy published in the Federal Register of December 10.

The Commissioner of Food and Drugs said there is widespread interest in the possible relationship between blood cholesterol levels and heart and artery diseases. As a result, he explained, reference to the term "cholesterol" in the labeling of common foods now being offered to the public may have the effect of a claim of special value for preventing or treating these diseases. The Commissioner added:

"Scientific investigations of fatty substances as a possible factor in lowering blood cholesterol and preventing heart

disease should be continued, and this policy statement does not interfere in any way with legitimate research and clinical evaluation of unsaturated fats in the diet. It is our responsibility, however, to point out that the public has been misled into relying prematurely on data which are still experimental, incomplete, and contradictory, and to head off false and misleading promotions based on such data."

Cholesterol is a substance that is manufactured in the body and has an important function in many of the body tissues. It is also present in animal fats and oils such as butter, lard, bacon, and meat fat. The blood level of cholesterol is controlled largely by synthesis in the body and is affected very little by the amount present in our foods. The agency further pointed out the view of nutrition scientists that it is impracticable for a person to add enough unsaturated fats to an otherwise unchanged diet to bring about any significant change in blood cholesterol. Increased weight, they add, is the only result that is likely to be achieved by increasing the intake of fats.

The policy statement, based on an extensive survey of leading medical authorities, published in the Federal Register, follows:

Title 21—FOOD AND DRUGS

Chapter I—Food and Drug Administration, Department of Health, Education, and Welfare

SUBCHAPTER A—GENERAL

PART 3—STATEMENTS OF GENERAL POLICY OR INTERPRETATION

Status of Articles Offered to the General Public for the Control or Reduction of Blood Cholesterol Levels and for the Prevention and Treatment of Heart and Artery Disease Under the Federal Food, Drug, and Cosmetic Act

Under the authority vested in the Secretary of Health, Education, and Welfare by the Federal Food, Drug, and Cosmetic Act (sec. 701(a), 52 Stat. 1055, as amended; 21 U.S.C. 371) and delegated to the Commissioner of Food and Drugs

by the Secretary (23 P.R. 9500), and pursuant to the Administrative Procedure Act (sec. 3, 40 Stat. 237; 5 U.S.C. 1002), the following statement of policy is issued.

§ 3.41 Status of articles offered to the general public for the control or reduction of blood cholesterol levels and for the prevention and treatment of heart and artery disease under the Federal Food, Drug, and Cosmetic Act.

(a) There is much public interest and speculation about the effect of various fatty foods on blood cholesterol and the relationship between blood cholesterol levels and diseases of the heart and arteries. The general public has come to associate the term "cholesterol" with these diseases. A number of common food fats and oils and some other forms of fatty substances are being offered to the general public as being of value in the control or reduction of blood cholesterol levels and for the prevention or treatment of diseases of the heart or arteries.

(b) The role of cholesterol in heart and artery diseases has not been established. A causal relationship between blood cholesterol levels and these diseases has not been proved. The advisability of making extensive changes in the nature of the dietary fat intake of the people of this country has not been demonstrated.

(c) It is therefore the opinion of the Food and Drug Administration that any claim, direct or implied, in the labeling of fats and oils or other fatty substances offered to the general public that they will prevent, mitigate, or cure diseases of the heart or arteries is false or misleading, and constitutes misbranding within the meaning of the Federal Food, Drug, and Cosmetic Act.

(Sec. 701, 52 Stat. 1055, as amended; 21 U.S.C. 371. Interprets or applies sec. 403 (a), 52 Stat. 1047; 21 U.S.C. 343 (a).)

Dated: December 7, 1959.

[SEAL] GEO. P. LARRICK,
Commissioner of Food and Drugs.



Department of the Interior

FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

FROZEN RAW BREADED FISH PORTIONS VOLUNTARY STANDARDS PROPOSED:

Frozen raw breaded fish portions (including raw breaded fish sticks) voluntary grade standards are proposed by the U. S. Bureau of Commercial Fisheries. The regulations are proposed for adoption in accordance with the authority contained in Title II of the Agricultural Marketing Act of August 14, 1956, as amended. Functions under that Act pertaining to fish, shellfish, and any products thereof were transferred to the Department of the Interior by section 6(a) of the Fish and Wildlife Act of August 8, 1956.

The proposed standards, if recommended to the Secretary of the Interior for adoption and made effective, will be the first issued by the Department prescribing voluntary grade standards for frozen raw breaded fish portions. The proposed regulations were published in the December 5, 1959, issue of the Federal Register.

The proposed standards include product and grade description; factors of quality, including ascertaining the grade, evaluation of flavor, odor, appearance, absence of defects, and character; definitions and methods of analysis; lot certification tolerances; and score sheet.

The frozen raw breaded fish portions are described as uniformly-shaped unglazed masses of cohering pieces (not ground) of raw fish meat coated with suitable, wholesome batter and breading, at least 3/8-inch thick.

Standards for fried or cooked breaded fish sticks have been in effect for some time.



Treasury Department

FROZEN TROUT FROM JAPAN NOT BEING SOLD AT LESS THAN FAIR VALUE IN U. S.:

The U. S. Department of the Treasury has determined that frozen brook trout from Japan are not being sold in the United States at less than fair value. This was announced in the December 22, 1959, Federal Register. The notice points out that a complaint was received that frozen trout from Japan were being sold to the United States at less than fair value within the meaning of the Antidumping Act of 1921. The ruling as published in the Federal Register of December 22, 1959, follows:

Office of the Secretary

[AA 643.3]

FROZEN TROUT FROM JAPAN

Determination of No Sales at Less Than Fair Value

DECEMBER 11, 1959.

A complaint was received that frozen trout from Japan were being sold to the United States at less than fair value within the meaning of the Antidumping Act of 1921.

I hereby determine that frozen trout from Japan are not being, nor are likely to be, sold in the United States at less than fair value within the meaning of section 201(a) of the Antidumping Act, 1921, as amended (19 U.S.C. 160(a)).

Statement of reasons: It was determined that merchandise similar or identical to the merchandise sold for exportation to the United States was sold for home consumption in Japan in sufficient quantities to form an adequate basis of comparison. The comparison disclosed that purchase price was not less than home market price, after appropriate adjustment for higher costs of packing on sales to the United States.

This determination and the statement of reasons therefor are published pursuant to section 201(c) of the Antidumping Act, 1921, as amended (19 U.S.C. 160(c)).

[SEAL] LAURENCE B. ROBBINS,
Acting Secretary of the Treasury.



Eighty-Sixth Congress

(Second Session)

CONGRESS RECONVENES: The second session of the 86th Congress convened January 6, 1960. The first session adjourned September 15, 1959. All



legislation before the House and Senate during the first session remained in its status as of adjournment and is subject to further consideration during the second session. Bills intro-

duced in the first session do not have to be reintroduced. Bills reported out of a committee or passed by one body of Congress remained in status quo and do not have to retrace legislative steps during the second session.

FISH SPAWNING PROTECTION IN SALMON RIVER: S. 2586 (Church and Neuberger), bill pending before the Senate Interstate and Foreign Commerce Committee; introduced in Senate August 24, 1959, during the first session of the 86th Congress. Amendment introduced in Senate January 19, 1960, proposes to further strengthen original bill by prohibiting the licensing of any dam on the Salmon River, Idaho, whether or not such dam would prove more or less restrictive to the passage of salmon than existing down-stream structures; referred to the Committee on Interstate and Foreign Commerce. As amended, the bill would keep the Salmon River open and unobstructed until the fish passage problem has been satisfactorily solved.

INTERSTATE AND FOREIGN COMMERCE COMMITTEE INVESTIGATIONS OF FISHERIES AND RELATED MATTERS: S. Res. 243 (Magnuson), a resolution to authorize the Senate Committee on Interstate and Foreign Commerce to examine, investigate, and make a complete study of several matters, including fisheries and wildlife; referred to the Committee on Interstate and Foreign Commerce; introduced in Senate January 14, 1960.

NATIONAL FISHERIES CENTER: S. 2840 (Beall and Byrd), a bill to create a Federal planning commission to conduct a study of the possible establishment of a National Fisheries Center in the District of Columbia; to the Committee on the District of Columbia; introduced in Senate January 18, 1960.

Also identical bills H. R. 9691 (McMillan), introduced in House January 18; and H. R. 9722 (Aspinall) and H. R. 9727 (Brodyhill), both introduced in House January 19, 1960.

OCEANOGRAPHY: H. R. 9361 (Pelly) a bill to advance the marine sciences, to establish a com-

prehensive 10-year program of oceanographic research and surveys; to promote commerce and navigation, to secure the national defense; to expand ocean resources; to authorize the construction of research and survey ships and facilities; to assure systematic studies on effects of radioactive materials in marine environments; to enhance the general welfare and for other purposes; to the Committee on Merchant Marine and Fisheries; introduced in House January 6, 1960. The bill, titled "The Marine Sciences and Research Act of 1959" provides for a 10-year program relating to objectives expressed in Senate Resolution 136, introduced June 22, 1959, and adopted by Senate July 15, 1959. Identical bill S. 2692, introduced in Senate September 11, 1959.

The bill would authorize the Secretary of the Interior to carry out the following activities: make grants of funds to qualified scientists, research laboratories, or institutions in furtherance of oceanographic studies; initiate and carry out a program for the replacement, modernization, and enlargement in the number of oceangoing vessels used for research, exploration, and surveys of marine resources; construct and operate shore facilities and laboratories to effectively support the vessels provided for in preceding item; cooperate with other agencies and departments in conducting oceanwide surveys; conduct studies concerning the relation of marine life to radioactive elements; conduct studies of the economic and legal aspects of commercial fisheries and the utilization of marine products; request and obtain cooperation from other governmental agencies and several states having an interest in marine sciences; and take such action and carry out other activities which will accomplish the purposes of this Act. For carrying out the provisions of this Act, funds are authorized in addition to other appropriations to the Bureau of Commercial Fisheries during the 10-year period beginning with July 1 of the first fiscal year following approval of this Act by the President. Bill also includes authorizations for work by the Department of Commerce, Department of Health, Education and Welfare, Office of Education, Department of the Navy, National Science Foundation Division of Marine Sciences (established by bill), and Department of the Interior, Bureau of Mines.

SEAWEEDS (GROUND, POWDERED, OR GRANULATED) ON FREE IMPORT LIST: Senate Report No. 1020, Free Importation of Ground, Powdered, or Granulated Seaweeds (January 13, 1960, 86th Congress, 2nd Session, Report from the Committee on Finance to accompany H. R. 5887), 2 pp., printed. Report contains purpose and provisions of the bill, committee recommendations, changes in existing law, and Paragraphs 1540 and 1722 of the Tariff Act of 1930 as amended. Committee encountered no opposition to the bill and recommended passage of the bill.

SHRIMP CONSERVATION CONVENTION WITH CUBA: S. 2867 (Magnuson), a bill to give effect to the Convention between the United States and Cuba for the conservation of shrimp, signed at Havana August 15, 1958; referred to the Committee on Interstate and Foreign Commerce; introduced in Senate January 20, 1960.

TRANSPORTATION POLICIES: S. Res. 244 (Magnuson), a resolution to authorize the Committee on Interstate and Foreign Commerce to examine, investigate, and make a complete study of transportation regulation, Government assistance

to transportation, Federal policies on consolidations and mergers in the transportation industry, and other related matters; referred to the Committee on Interstate and Foreign Commerce; introduced in Senate January 14, 1960.



HORS d'OEUVRES AND CANAPES

These canapes suggested by the home economists of the U. S. Bureau of Commercial Fisheries should be appealing, attractive, and appropriate for parties.

GULF COAST SHRIMP BOIL

- | | |
|---|--------------------------|
| 2 pounds packaged (raw, frozen) fully peeled, deveined shrimp | 2 teaspoons whole cloves |
| 3 bay leaves | 2 quarts water |
| 1 tablespoon whole allspice | 2 medium onions, sliced |
| 1 1/2 teaspoons crushed red peppers | 6 cloves garlic |
| 2 1/2 teaspoons whole black peppers | 2 lemons, sliced |
| | 1/4 cup salt |

Tie spices in a piece of cheesecloth. To the water add onion, garlic, lemon, salt, and bag of seasonings; bring to a boil. Add shrimp; cover and return to the boiling point. Simmer 3 to 5 minutes, depending on size. Remove from heat and let stand in spiced water for 3 minutes. Drain and chill. Serve garnished with the whole spices and lemon slices. Yield: about 80 spiced shrimp.

TUNA PINEAPPLE DIP

- | | |
|------------------------------------|-------------------------------|
| 1 can (6 1/2 or 7 ounces) tuna | 3 tablespoons pineapple juice |
| 1 can (9 ounces) crushed pineapple | Dash salt |
| 1 package (8 ounces) cream cheese | Dash nutmeg |
| | Potato chips |

Drain tuna. Flake. Drain pineapple and save liquid. Soften cheese at room temperature. Combine all ingredients except potato chips; blend into a paste. Chill. Serve in a bowl surrounded by potato chips. Makes about 1 pint of dip.

CRAB SALAD IN PUFF SHELLS

- | | |
|------------------------------------|--------------------------------------|
| 1 pound crab meat | 1/2 teaspoon celery salt |
| 1 cup chopped celery | 1/2 teaspoon salt |
| 2 teaspoons lemon juice | Dash pepper |
| 2 teaspoons grated onion | 1/2 cup mayonnaise or salad dressing |
| 2 tablespoons chopped sweet pickle | |

Remove any shell or cartilage from crab meat. Combine all ingredients. Cut tops from puff shells. Fill each puff shell with approximately 2

teaspoons salad. Makes approximately 3 cups salad or fills 60 puff shells.

PUFF SHELLS

- | | |
|-----------------------------|-----------------------|
| 1/2 cup flour | 1/2 cup boiling water |
| Dash salt | 2 eggs |
| 1/4 cup butter or margarine | |

on well-greased cookie sheets, 15 1/2 x 12 inches. Bake in a very hot oven, 450° F., for 10 minutes; reduce heat to 350° F., and continue baking about 10 minutes longer. Makes approximately 60 puff shells.



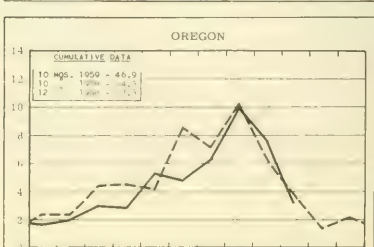
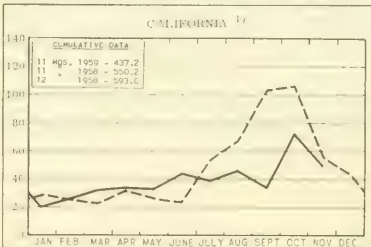
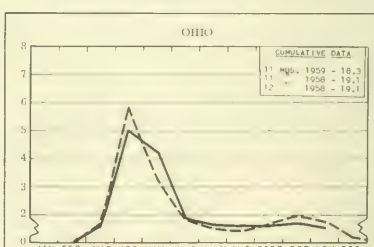
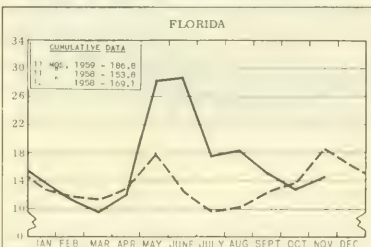
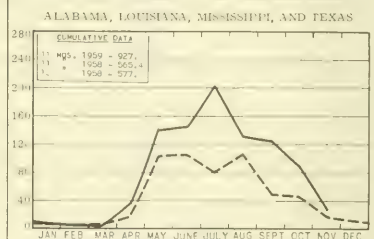
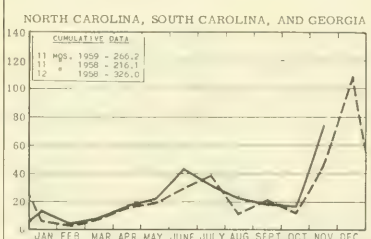
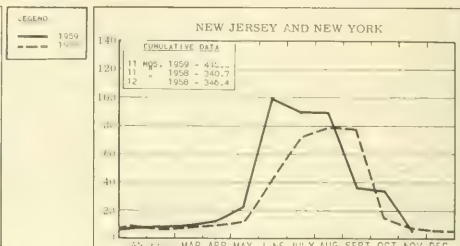
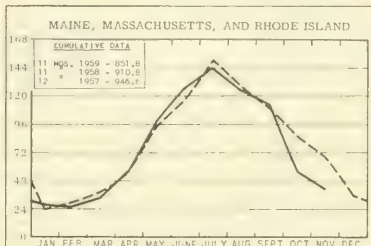
SMOKED SALMON CANAPES

Drain fish and grind twice. Cream the cheese and mayonnaise. Blend in fish, celery, and seasonings. Remove crusts from bread. Cut each slice into 3 strips and toast. Spread salmon on toast strips. Garnish with parsley. Makes 48 canapes.

- | | |
|--------------------------------------|-------------------------------|
| 1 can (7 ounces) smoked salmon | 1/4 teaspoon salt |
| 1 package (3 ounces) cream cheese | 1/4 teaspoon prepared mustard |
| 2 tablespoons mayonnaise or dressing | 16 slices bread |
| 1/2 cup chopped celery | Chopped parsley |



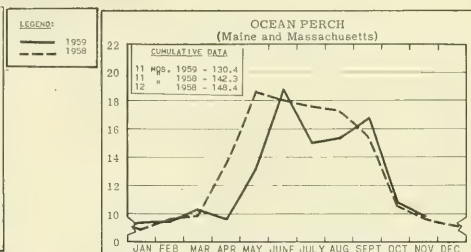
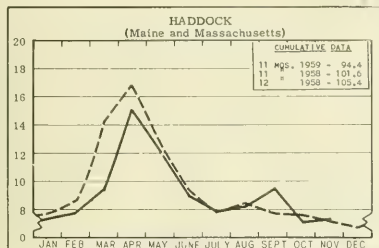
CHART 1 - FISHERY LANDINGS for SELECTED STATES
In Millions of Pounds



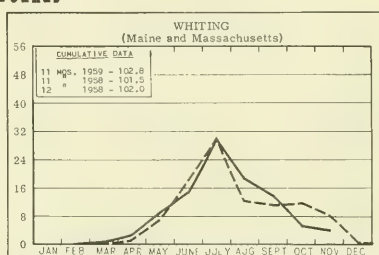
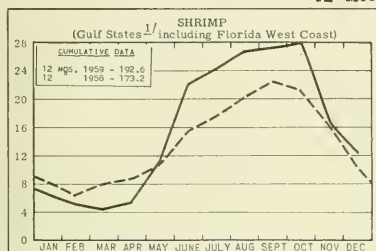
1/ONLY PARTIAL--INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH LANDINGS AT PRINCIPAL PORTS.

CHART 2 - LANDINGS for SELECTED FISHERIES

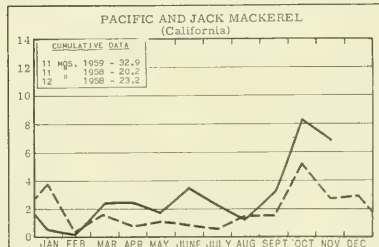
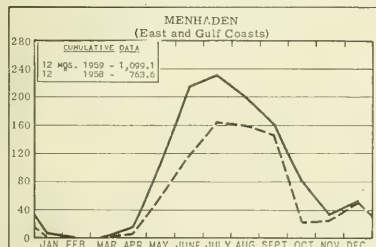
In Millions of Pounds



In Millions of Pounds

^{1/}A. & A.L.A. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

In Thousands of Tons



In Thousands of Tons

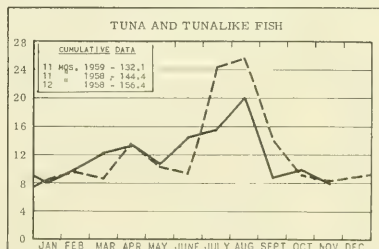
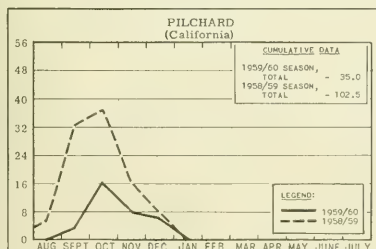
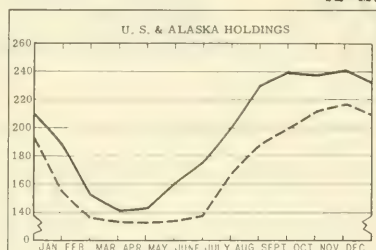


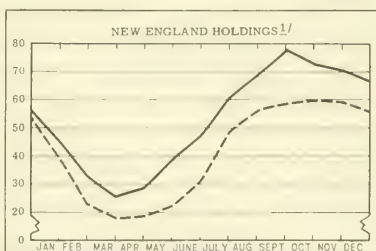
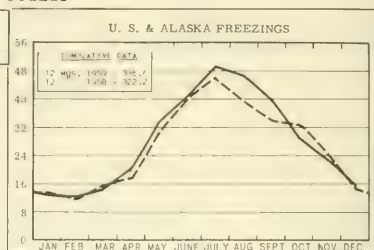
CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

In Millions of Pounds

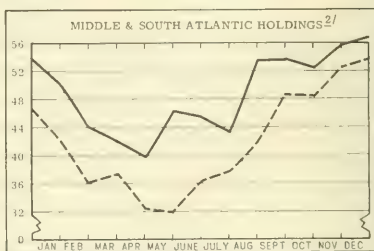


LEGEND:

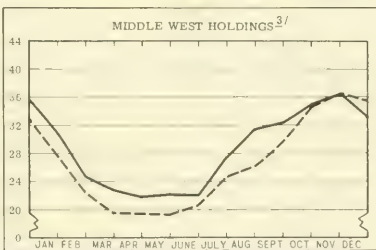
— 1959
--- 1958



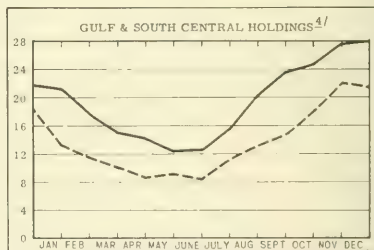
^{1/}MAINE, MASSACHUSETTS, RHODE ISLAND, AND CONNECTICUT



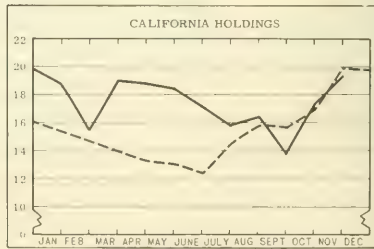
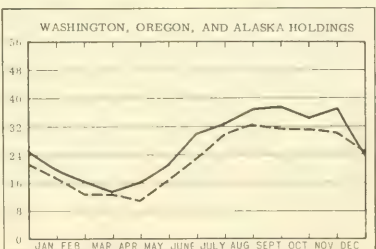
^{2/}ALL EAST COAST STATES FROM N. Y. SOUTH.



^{3/}OHIO, IND., ILL., MICH., WIS., MINN., IOWA, MO., N. DAK., NEBR., & KANS.



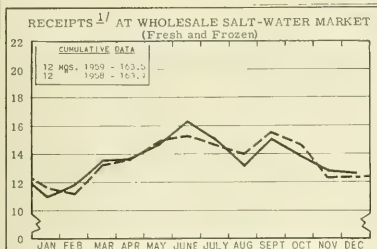
^{4/}ALA., MISS., LA., TEX., ARK., KY., & TENN.



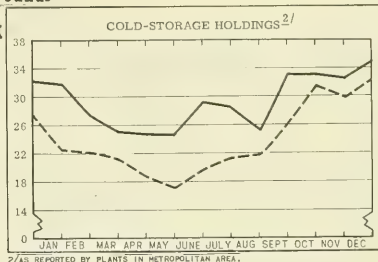
* Excludes salted, cured, and smoked products.

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

In Millions of Pounds

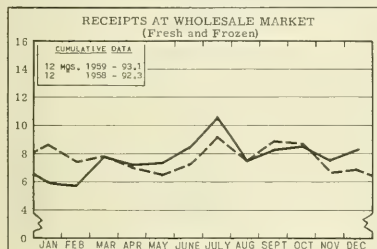


NEW YORK CITY

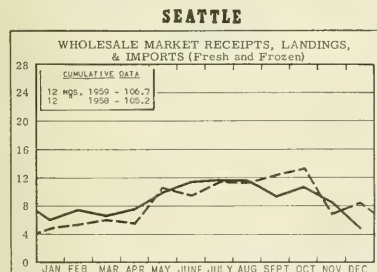
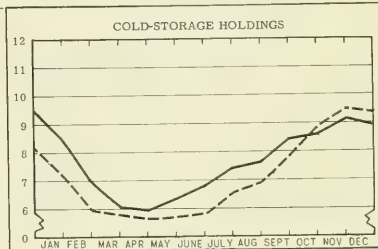


^{1/} INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.

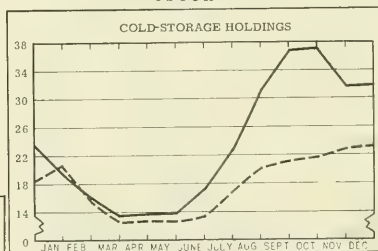
^{2/} AS REPORTED BY PLANTS IN METROPOLITAN AREA.



CHICAGO



BOSTON



LEGEND:
 — 1959
 - - 1958

CHART 5 - FISH MEAL and OIL PRODUCTION - U.S. and ALASKA

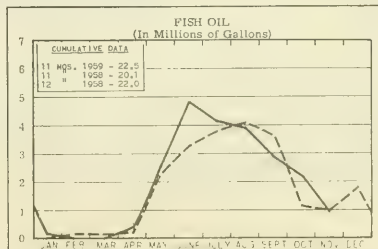
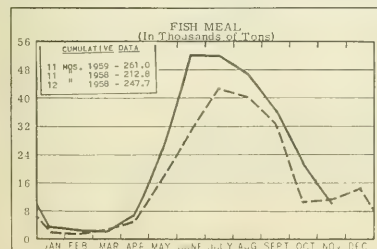
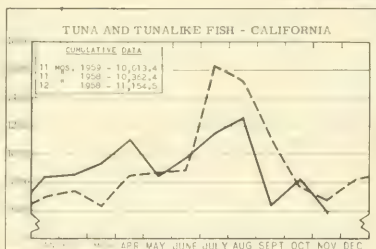


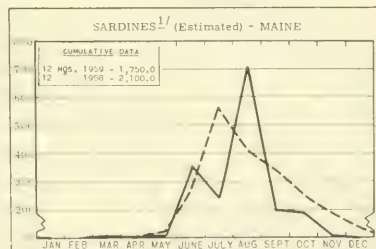
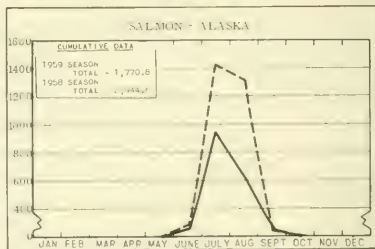
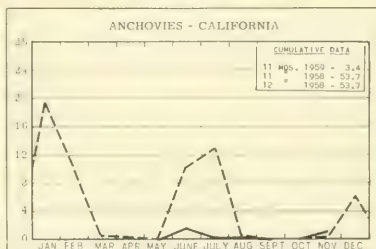
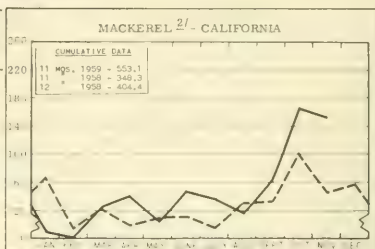
CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

In Thousands of Standard Cases



LEGEND:

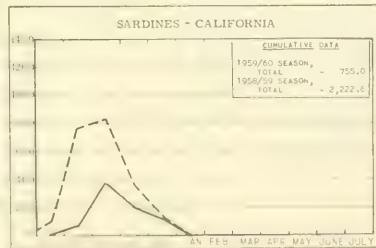
— 1959
- - - 1958



1/ INCLUDING SEA HERRING.

STANDARD CASES

Variety	No. Cans	Designation	Net Wgt.
SARDINES....	100	1/2 drawn	3 1/2 oz.
SHRIMP	48	--	5 oz.
TUNA	48	# 1/2 tuna	5 & 7 oz.
PILCHARDS...	48	# 1 oval	15 oz.
SALMON.....	48	1-lb. tall	16 oz.
ANCHOVIES...	48	1/2-lb.	8 oz.



LEGEND:

— 1959/60
- - - 1958/59

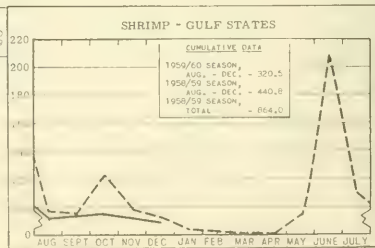
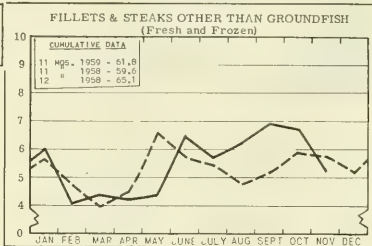
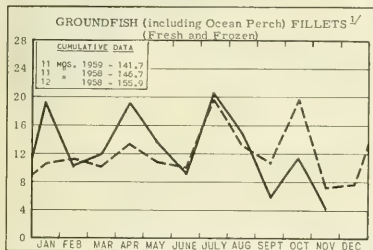
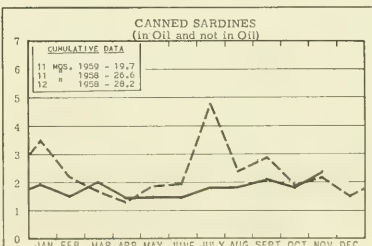
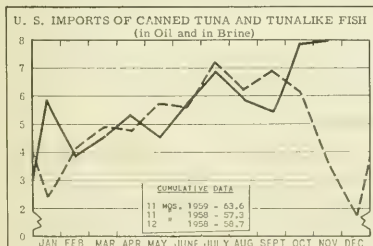
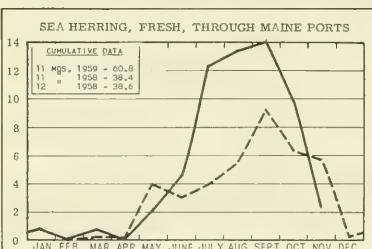
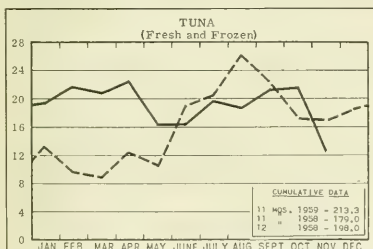
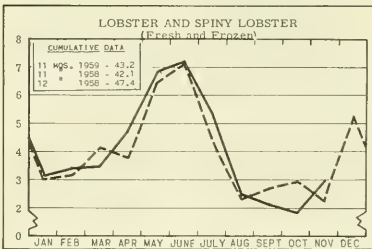
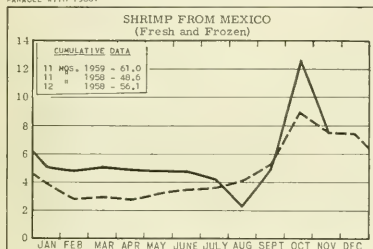


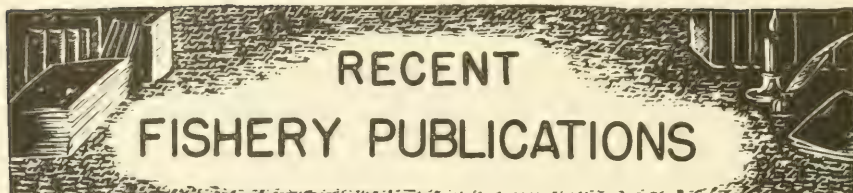
CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds



^{1/}SINCE SEPTEMBER 15, 1959, FISH FILLET BLOCKS ARE CLASSIFIED UNDER A DIFFERENT CATEGORY THAN FILLETS; THEREFORE, 1959 DATA ARE NO LONGER COMPARABLE WITH 1958.





RECENT FISHERY PUBLICATIONS

FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

- CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
FL - FISHERY LEAFLETS.
SL - BRANCH OF STATISTICS LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
WL - WILDLIFE LEAFLET.
SSR - FISH, SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number	Title
CFS-2144	- Texas Landings, August 1959, 3 pp.
CFS-2147	- Massachusetts Landings, August 1959, 5 pp.
CFS-2149	- North Carolina Landings, September 1959, 3 pp.
CFS-2153	- Fish Meal and Oil, September 1959, 2 pp.
CFS-2158	- New York Landings, August 1959, 4 pp.
CFS-2159	- New Jersey Landings, September 1959, 3 pp.
CFS-2161	- South Carolina Landings, September 1959, 2 pp.
CFS-2162	- Georgia Landings, September 1959, 2 pp.
CFS-2163	- Shrimp Landings, July 1959, 6 pp.
CFS-2166	- Maine Landings, September 1959, 3 pp.
CFS-2167	- Florida Landings, September 1959, 6 pp.
CFS-2169	- California Landings, June 1959, 4 pp.
CFS-2170	- Alabama Landings, August 1959, 2 pp.
CFS-2172	- Texas Landings, September 1959, 3 pp.
CFS-2173	- New York Landings, September 1959, 4 pp.
CFS-2177	- North Carolina Landings, October 1959, 3 pp.
CFS-2180	- Frozen Fish Report, October 1959, 8 pp.
CFS-2181	- South Carolina Landings, October 1959, 2 pp.
CFS-2185	- Rhode Island Landings, September 1959, 3 pp.
CFS-2187	- New Jersey Landings, October 1959, 3 pp.
CFS-2197	- Ohio Landings, September 1959, 2 pp.
CFS-2202	- New England Fisheries, 1958 Annual Summary, 7 pp.
CFS-2203	- Chesapeake Fisheries, 1958 Annual Summary, 7 pp.
CFS-2204	- Manufactured Fishery Products, 1958 Annual Summary, 7 pp.

Canned Fish Consumer Purchases:
FL-478k - September 1959, 31 pp.

Wholesale Dealers in Fishery Products (Revised):

- SL-1 - Maine, 1959.
SL-19 - Louisiana (Coastal Area), 1959.
SL-29 - Ohio (Great Lakes Area), 1959.
SL-31 - New York (Great Lakes Area), 1959.

WL-379 - Suggested List of Printed Publications on Fish and Wildlife Subjects, 2 pp., November 1958.

SSR-Fish. No. 276 - A List of References on the Biology of Shrimp (Family Penaeidae), by Edward Chin and Donald M. Allen, 146 pp., January 1959.

Fish Recipes for School Lunches, Test Kitchen Series No. 5, 27 pp., printed, 1959 (Revised). A booklet of recipes for quantity cookery of fish and shellfish in school cafeterias. Includes recipes for baked dishes, chowders, salads, and sandwiches with a number of variations on the basic ingredients of each recipe. Planned for 100 portions.

Dep. No. 574 - Results of Exploratory Shrimp Fishing off Washington and Oregon (1958).

Dep. No. 575 - Fish Flour for Human Consumption.

Dep. No. 576 - Sanitation Aboard Fishing Trawlers Improved by Using Chlorinated Sea Water.

Dep. No. 577 - Research in Service Laboratories (January 1960): Contains these articles--"Ocean Perch Filleting Machine Successfully Fillets Yellow Perch," and "Laboratory Work on Frozen Salmon Steak Standard Completed."

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

(Baltimore) Monthly Summary - Fishery Products, September and October 1959; 7 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 400 E. Lombard St., Baltimore 2, Md.) Receipts at Baltimore by species and by states and provinces for fresh- and salt-water fish and shellfish; and total receipts by species and comparisons with previous years; for the months indicated.

California Fishery Products Monthly Summary, October 1959, 13 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) California cannery receipts of tuna and tunalike fish, mackerel, anchovies and sardines; pack of canned tuna, mackerel, anchovies, and sardines; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California imports; canned fish and frozen

shrimp prices; ex-vessel prices for cannery fish; American Tuna Boat Association auction sales; for the month indicated.

(Chicago) Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Market Prices, October 1959, 13 pp. (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces for fresh- and salt-water fish and shellfish; and wholesale prices for fresh and frozen fishery products; for the month indicated.

Gulf Monthly Landings, Production, and Shipments of Fishery Products, October 1959, 6 pp. (Market News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; sponge sales; and fishery imports at Port Isabel and Brownsville, Tex., for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, November 1959, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 So. King St., Hampton, Va.) Fishery landings and production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.

New England Fisheries--Monthly Summary, October 1959, 22 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Reviews the principal New England fishery ports, and presents food fish landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, Provincetown, and Woods Hole), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and landings and ex-vessel prices for fares landed at the Boston Fish Pier and sold through the New England Fish Exchange; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly Summary for September 1959, 22 pp. (Market News Service, 155 John St., New York 38, N. Y.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, imports entered at New York City, primary wholesaler prices for frozen products, and marketing trends; for the month indicated.

(New York) List of Primary Brokers and Importers of Fishery Products and Byproducts, New York City, 1959-1960, 16 pp. (Market News

Service, U. S. Fish and Wildlife Service, 155 John St., New York 38, N. Y.)

(Seattle) Washington, Oregon, and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, October 1959, 9 pp. (Market News Service, U. S. Fish and Wildlife Service, Pier 42 South, Seattle 4, Wash.) Includes landings and local receipts, with ex-vessel and wholesale prices in some instances, as reported by Seattle and Astoria, (Ore.) wholesale dealers; also Northwest Pacific halibut landings; and Washington shrimp landings; for the month indicated.

Use of Chemical Barriers to Protect Shellfish Beds from Predators, by V. L. Loosanoff, C. L. MacKenzie, Jr., and L. W. Shearer, 9 pp., processed. (Biological Laboratory, U. S. Fish and Wildlife Service, Milford, Conn., 1959.) This paper, which was presented at the July 1959 meeting of the National Shellfisheries Association, describes new, cheap, simple, but effective chemical method of controlling enemies of mollusks grown for human consumption. The method and its ramifications and modifications are designed to control boring gastropods, such as oyster drills and Polinices, starfish, crabs, and other enemies of commercial mollusks, primarily by preventing their invasion of shellfish grounds. The basic idea of the method is comparatively old, having been advocated and developed by the senior author since 1946. It is founded on the principle of surrounding the beds with "barriers" or "belts" containing chemicals which either stop, repel, or kill undesirable forms.

On the Identification of Chum Salmon Stocks in the North Pacific by Means of Scales, Part I, by Tetsuo Kobayashi and Shin-ichi Abe, 34 pp., processed, limited distribution. (Translation of INPFC Doc. 207, Hokkaido Salmon Hatchery, August 1958.) Pacific Salmon Investigations, U. S. Fish and Wildlife Service, 2725 Montlake Blvd., Seattle 2, Wash., October 17, 1958.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Fauna of the Aleutian Islands and Alaska Peninsula, with Notes on Invertebrates and Fishes Collected in the Aleutians, 1936-38, by Victor B. Schaffer, North American Fauna No. 61, 420 pp., illus., printed, \$1.25.

"Food-Fish Farming in the Mississippi Delta," by Malcolm C. Johnson, article, The Progressive Fish-Culturist, vol. 21, no. 4, October 1959, pp. 154-160, printed, single copy 25 cents. Presents the novel but potentially lucrative idea of rotation of crops of rice with crops of fish. After several crops of rice have been harvested by which time the land has become less productive, the fields are flooded to a depth of 18 inches or more with fingerling catfish, bass, or buffalo-fish. At the end of two years, the fish are harvested and the fields replanted with rice. Advantages of this system are increased soil fertility, increased rice yields, cash fish crops, recreational value, a long-range increase in

human food, and soil that doesn't blow away while it is lying fallow. The U. S. Fish and Wildlife Service is a sponsor of an experiment station to be built in Arkansas to assist farmers in refining and standardizing techniques in this type of pond fishery.

Food of the Squawfish *PTYCHOCEILUS OREGONENSIS* (Richardson) of the Lower Columbia River, by Richard B. Thompson, *Fishery Bulletin* 158 (From *Fishery Bulletin of the Fish and Wildlife Service*, vol. 60), 20 pp., illus., printed, 20 cents, 1959.

Vertical Distribution of Pelagic Fish Eggs and Larvae Off California and Baja California, by Elbert H. Ahlstrom, *Fishery Bulletin* 161 (From *Fishery Bulletin of the Fish and Wildlife Service*, vol. 60), 44 pp., illus., printed, 35 cents, 1959.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATIONS ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ALGAE:

The Marine Algae of the Labrador Peninsula and Northwest Newfoundland (Ecology and Distribution), by Robert T. Wilce, *Bulletin* No. 158, 107 pp., illus., printed, C\$1.50. National Museum of Canada, Department of Northern Affairs and National Resources, Ottawa, Canada, 1959.

Some Features of Marine Algal Distribution in Norway, by T. Braarud (Reprinted from *Acta Adriatica*, vol. VIII, No. 15, 8 pp., printed in English with summary in Serbo-Croatian. Institut za Oceanografiju i Ribarstvo, Split, Jugoslavia, 1958.

ANTIBIOTICS:

"Antibiotic Residues in Fish Iced with Chlortetracycline Ice and Effect of Normal Cooking Procedures on These Residues," by J. W. Boyd, B. A. Southcott, and H. L. A. Tarr, article, *Antibiotics Annual*, 1956-1957, pp. 1002-1005, printed. *Antibiotics Annual*, 1956-1957, Medical Encyclopedia, Inc., 30 E. 60th St., New York 22, N. Y.

"The Use of Antibiotics for the Control of Spoilage in the East Coast Fisheries. Part 1--Introduction and the Use of Antibiotics in Gutted Cod and Haddock Aboard Trawlers," by C. H. Castall and M. F. Greenough, article, *Canadian Fisherman*, vol. 45, no. 10, October 1958, pp. 6-8, printed. Canadian Fisherman, National Business Publications, Ltd., Gardenvale, Quebec, Canada.

"The Use of Antibiotics for the Control of Spoilage in the East Coast Fisheries. Part 2--The Effect of Antibiotics on the Keeping Time of Fillets," by C. H. Castall and M. F. Greenough, article, *Canadian Fisherman*, vol. 45, no. 11, November 1958, pp. 20-22, printed. Canadian Fisherman, National Business Publications, Ltd., Gardenvale, Quebec, Canada.

"The Use of Antibiotics for the Control of Spoilage in the East Coast Fisheries. Part 2--The Effect of Antibiotics on the Keeping Time of Fillets," by C. H. Castall and M. F. Greenough, article, *Canadian Fisherman*, vol. 45, no. 11, November 1958, pp. 20-22, printed. Canadian Fisherman, National Business Publications, Ltd., Gardenvale, Quebec, Canada.

AUSTRALIA:

Australian Journal of Marine and Freshwater Research, vol. 10, no. 2, October 1959, 143 pp., illus., printed. Australian Journal of Marine and Freshwater Research, Commonwealth Scientific and Industrial Research Organization, 314 Albert St., East Melbourne, C. 2, Australia. Features, among others, articles on: "The Naturalization of the Pacific Oyster in Australia," by J. M. Thompson; and "The Status of the School Shark Fishery in South-Eastern Australian Waters," by A. M. Olsen.

The Freshwater Fishes of New South Wales, by John S. Lake, *Research Bulletin* No. 5, 25 pp., illus., printed. State Fisheries, Chief Secretary's Department, New South Wales, Sydney, Australia, 1959.

The Status of the East Gippsland Bream Fishery, by John K. Ling, *Fisheries Contribution* No. 8, 20 pp., illus., processed. Fisheries and Game Dept., 605 Flinders St., Melbourne C. 3, Australia, November 1958.

CANADA:

Progress Reports of the Atlantic Coast Stations, no. 72, 39 pp., illus., printed in French and English. Queen's Printer and Controller of Stationery, Ottawa, Canada, September 1959. Contains, among others, these articles: "Growth and Parasites of Cod during a Year in Captivity," by A. C. Kohler; "Constituents of Salt Cod Pickle," by F. W. van Klaveren and E. Vaillancourt; "Squid Inshore in Newfoundland and on the Grand Bank, 1953 to 1958," by H. J. Squires; "Drift-Netting for Herring along the South Coast of Newfoundland," by S. N. Tibbo; and "Fat Hydrolysis in Frozen Fish. 2--Relation to Protein Stability," by Doris I. Fraser and W. J. Dyer.

Summary Report on Fishery Investigations and Groundfish Landings in Newfoundland during 1957, by A. M. Fleming and Marjorie E. Prouse, *Circular* No. 5, 41 pp., processed. Fisheries Research Board of Canada, Biological Station, St. John's, Newfoundland, 1958.

Variations dans le Quebec de l'Abondance Annuelle des Poissons Originaires des Grands-Lacs (Variations in Quebec in the Annual Abundance of Fishes Originating in the Great Lakes), by Vadim D. Vladkyov and G. Beaulieu, *Contribution* No. 70, 9 pp., illus., printed in French. (Reprinted from *Le Naturaliste Canadien*, vol. LXXXV, Nos. 6-7, June-July 1958.) Department of Fisheries, Rm. 127, E. Bldg., Quebec, Canada.

COLD STORAGE:

"Studies on the Discoloration in Fish Meat during Freezing Storage. I--A Spectrophotometric Method for the Simultaneous Determination of Ferrous and Ferric Forms of Myoglobin in Their Mixed Solution," by Y. Sano and K. Hashimoto, article, *Bulletin of the Japanese Society of Scientific Fisheries*, vol. 24, no. 6-7, 1958, pp. 519-523, illus., printed in Japanese with

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

English abstract. Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

"Studies on Muscle of Aquatic Animals. XXXIX--Changes in Muscle of Yellowtail (*Seriola quinqueradiata*) during Cold Storage," by U. Simidu, H. Terashima, and W. Simidu, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 24, no. 6-7, 1958, pp. 586-590, illus., printed in Japanese with English summary. Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

COLUMBIA RIVER:

Summary Report on the Indian Fishery at Celilo Falls and Vicinity, Columbia River, 1947-1954, 25 pp., illus., processed. Corps of Engineers, U. S. Army, Portland, Ore., August 1955.

DISEASES OF FISH:

Tuberculosis in Pacific Salmon and Steelhead Trout, by James W. Wood and Erling J. Ordal, Contribution No. 25, 38 pp., illus., printed. Fish Commission Research Laboratory, Rt. 1, Box 31A, Clackamas, Ore., December 1958.

ELECTRICAL FISHING:

"Erfahrungen über Leitfähigkeitsmessungen und Härtebestimmungen im Rahmen der Elektro-fischerei und Gewässerbonitierung" (Experience in Measuring the Conductivity and Determining the Hardness of Water in Connection with Electrofishing and Evaluation of Water), by G. Buhse, article, Der Fischwirt, vol. 8, no. 6, pp. 160-161, printed in German. Deutscher Fischerei-Verband, Neuerwall 72, Hamburg 36, W. Germany.

"Gefahren und Schutzmassnahmen bei der Elektro-fischerei" (Dangers and Protective Measures in Electrofishing), by A. Hosl, article, Der Fischwirt, vol. 8, no. 1, January 1958, pp. 16-18, printed in German. Deutscher Fischerei-Verband, Neuerwall 72, Hamburg 36, W. Germany.

"Neuartige Thunfischangel in der Elektro-fischerei" (New Type of Tuna Hook in Electrofishing), by K. Schultz, article, Schiff und Hafen, vol. 10, no. 9, September 1958, pp. 752-754, printed in German. C. D. C. Heydorns Buchdruckerei, Uetersen bei Hamburg, W. Germany.

"Vorschriften für die Errichtung und den Betrieb von Elektro-fischereianlagen in Binnengewässern" (Regulations for the Installation and Operation of Electrical Fishing Gear in Fresh-water Areas), article, Allgemeine Fischerei Zeitung, vol. 83, no. 15, August 1958, pp. 293-294, printed in German. Bayer, Landwirtschaftsverlag, G. m. b. H., Marsstrasse 22, Munich 2, W. Germany.

FATTY ACIDS:

Nutritive Value of Highly Unsaturated Fatty Acids and the Origin of Toxicity of Fish Oils, by Takashi Kaneda, Hisae Sakai, and Seinosuke Ishii, 11 pp., illus., printed in Japanese with English abstract. (Reprinted from Journal of Japanese Society of Food and Nutrition, vol. 7,

no. 4, December 1954, pp. 1-10.) Chas. E. Tuttle Co., 28-30 So. Main St., Rutland, Vt.

Nutritive Value or Toxicity of Highly Unsaturated Fatty Acids. I, by Takashi Kaneda and Seinosuke Ishii, 9 pp., illus., printed. (Reprinted from The Journal of Biochemistry, vol. 41, no. 3, 1954, pp. 327-335.) Department of Biochemistry, Faculty of Medicine, Tokyo University, Bunyo-ku, Tokyo, Japan.

Nutritive Value or Toxicity of Highly Unsaturated Fatty Acids. II, by Takashi Kaneda, Hisae Sakai, and Seinosuke Ishii, 13 pp., illus., printed. (Reprinted from The Journal of Biochemistry, vol. 42, no. 5, 1955, pp. 561-573.) Department of Biochemistry, Faculty of Medicine, Tokyo University, Bunyo-ku, Tokyo, Japan.

Studies on the Nutritive Value of Lipides. XII--Nutritive Value or Toxicity of Highly Unsaturated Fatty Acids (3), by Takashi Kaneda, Hisae Sakai, and Seinosuke Ishii, 8 pp., illus., printed in Japanese with English abstract. (Reprinted from Bulletin of the Japanese Society of Scientific Fisheries, vol. 20, no. 7, November 1954, pp. 658-663.) Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

FISH CULTURE:

Trout and Salmon Culture (Hatchery Methods), by Earl Leitritz, Fish Bulletin No. 107, 169 pp., illus., printed, \$2. Printing Division, Documents Section, North Seventh St. at Richards Blvd., Sacramento 14, Calif., 1959. A practical handbook for acquainting the new hatchery employee with the rudiments of fish culture, and also to serve as a reference for experienced personnel. "During the past 10 or 12 years, applied science and mechanics have revolutionized fish hatchery operations," asserts the author. This text describes such advances as the uses of new chemicals in treating diseases in hatcheries, eradicating undesirable fish populations, artificial spawning, new methods of transporting fish and eggs, and the employment of labor-saving devices such as fish loaders, self-graders, incubators, and dry feeds.

FISH LIVER OILS:

Studies on the Nutritive Values of Lipids. IX--Nutritive Value of Polymerized Liver Oil of Dog Fish, by Takashi Kaneda and Kimie Arai, 4 pp., printed in Japanese with English summary. (Reprinted from Bulletin of the Japanese Society of Scientific Fisheries, vol. 19, no. 5, 1953, pp. 700-702.) Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

FISH MEAL:

"Screening Before Milling of Fish Meal Reduces the Proportion of Fine Particles, by R. M. Duncan, article, Food Industries of South Africa, vol. 12, no. 3, August 1958, pp. 24-26, printed. Food Industries of South Africa, P. O. Box 4245, Cape Town, Union of South Africa.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

"Tests Show Bulk Storage of Fish Meal Successful," article, *Feedstuffs*, vol. 30, no. 32, August 1958, p. 78, printed. *Feedstuffs*, Miller Publishing Co., 2501 Wayzata Blvd., Minneapolis 5, Minn.

FISH OILS:

"Los Aceites de Pescado en la Industria de Pinturas--I" (Fish Oils in the Painting Industry--Parts I and II), by J. Huesa Lope, article, *Grasas y Aceites*, vol. 8, no. 5, 1957, pp. 226-229, printed in Spanish. Instituto de la Grasa y sus Derivados, Avenida de Heliópolis, Sevilla, Spain.

Nutritive Value or Toxicity of Oils of Salted and Dried Fishes, by Takashi Kaneda, Hisae Sakai, and Seinosuke Ishii, 7 pp., illus., printed in Japanese with English abstract. (Reprinted from *Bulletin of the Japanese Society of Scientific Fisheries*, vol. 20, no. 7, 1954, pp. 664-669.) Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori, 6-Chome, Tokyo, Japan.

Studies on the Polymerization and Oxidation of Marine Animal Oils. I--Preparation of Edible Oil from Marine Animal Oils, by Hideo Higashi, Shigeo Murayama, and Kikuko Tabei, 14 pp., illus., printed in Japanese with English summary. (Reprinted from *Bulletin of the Japanese Society of Scientific Fisheries*, vol. 19, no. 4, 1953, pp. 537-550.) Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

FISHERIES MANAGEMENT:

Biological and Economic Aspects of Fisheries Management, edited by James A. Crutchfield, 166 pp., processed, University of Washington, Seattle, Wash. Proceedings of a conference on biological and economic aspects of fisheries management held under the auspices of the College of Fisheries and the Department of Economics of the University of Washington at Seattle, February 17-19, 1959. Economists, fisheries biologists, and members of the commercial fishing industry attended the sessions. The report, which contains the papers delivered and summary notes of the discussions, faithfully describes the transactions.

After a brief discussion of the background for the conference, it launches immediately into the topics of the various sessions which covered: (1) biological and economic aspects of fishery management; (2) halibut fishery management; (3) salmon management in Alaska; and (4) international trade policies and their relation to fisheries. At times the discussions became very lively. As a result much thought-provoking information is set down. Such factors are covered as the effect of management regulations on the conduct of efficient operations in managed fisheries, the need to limit entry of individuals into certain fisheries, the effect of certain controls on processing and marketing operations, the effect of certain types of controls on costs and profits in the industry, etc.

An address entitled "Canada and the Abstention Principle," by Honorable James Sinclair, former Canadian Minister of Fisheries, is also included in the report. Sinclair's remarks on this important subject are very penetrating.

--W. H. Stoltzing

FLOATING TRAWLS:

"Entwicklungsstand und Einsatzbedingungen Pelagischer Schleppnetze" (State of Development and Working Conditions of Floating Trawls), by G. Kajewski, article, *Fischereiforschung*, vol. 1, no. 1, August 1958, pp. 1-4, printed in German. Institut für Hochseefischerei und Fischverarbeitung, Rostock-Marienehe, E. Germany.

FOOD AND AGRICULTURE ORGANIZATION:

La Peche en Italie et la Distribution du Poisson (The Italian Fishery and the Distribution of Fish), by Paolo Pagliazzi, Technical Paper No. 60, 2 pp., processed in French. General Fisheries Council for the Mediterranean, Food and Agriculture Organization of the United Nations, Rome, Italy.

La Preparation des Catalogues des Noms de Poissons et la Methode de la Geographie Linguistique (The Preparation of Catalogs of Fish Names and the Linguistic Geography Method), by Vojmir Vinja, Technical Paper No. 55, 6 pp., processed. General Fisheries Council for the Mediterranean, Food and Agriculture Organization of the United Nations, Rome, Italy, 1958.

The State of Food and Agriculture, 1959, 206 pp., illus., printed, US\$2. Food and Agriculture Organization of the United Nations, Rome, Italy. (For sale by International Documents Service, Columbia University Press, 2960 Broadway, New York 27, N. Y.) Reviews the world food and agriculture situation during the year ended June 30, 1959, with particular emphasis on the underdeveloped nations. Includes a short section on fishery production which notes that the world catch for 1958 was considerably higher than in 1957. A slightly longer section on fishery policies mentions international conferences concluded or ratified during 1958/59, government assistance to fisheries, and utilization of fishery resources in less-developed countries.

Yearbook of Fishery Statistics, 1958 (Production and Fishing Craft), vol. IX, 454 pp., illus., processed in English, French, and Spanish, \$4. Food and Agriculture Organization of the United Nations, Rome, Italy, 1959. (Sold in United States by Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N. Y.) As in previous years, this edition contains fishery statistics on catches, production of preserved and processed commodities, fishing craft, and whaling from all countries. The maps and graphs section of the Yearbook has been further expanded by the addition of diagrams showing the world catch by continents and the catches of the larger producing countries for a number of years. The total world catch of fishery products for 1958 is estimated at 33.7

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million metric tons compared with 30.6 million tons for 1957.

GEAR:

"A Simple Rig for Multiple Trolling with Reels and Wire Lines," by W. A. King-Webster, article, *World Fishing*, vol. 8, no. 11, November 1959, pp. 25-26, 60, illus., printed. Outlines a new type of gear being tested in trolling for pelagic fish by the Trinidad Fisheries Department. This method utilizes a high speed manual reel attached to a bamboo outrigger, enabling one vessel to operate many more lines simultaneously than was previously possible by hand hauling.

GENERAL:

Seefischerei in Gegenwart und Zukunft (Sea Fishing Now and in the Future), by C. Birkhoff, 153 pp., illus., printed in German. Nordwestdeutscher Verlag Ditzgen and Co., Bremerhaven, W. Germany, October 1957. Deals with the problems, methods, and vessels of the world fishing industry together with a dictionary of fishery technological terms. Topics covered include: the sea, the source of food of the future; necessity of extension of our fish catching areas; fish catching with traps and stationary nets; line and hook fishing; cutter, seine net, tuna, and drift-net fishing; trawling, both side and stern; whaling; catching equipment and methods of tomorrow; and the floating trawl. Also contains information on: electrofishing; fish detection; the history of factoryships; factory trawlers and motherships; operation of a fishing fleet; fish harbors; from catching to consumption; and the future of fishing.

HALIBUT:

Halibut—Observations on its Size at First Maturity, Sex Ratio and Length/Weight Relationship, by Bennet B. Rae, Scottish Home Department Marine Research No. 4, 1959, 19 pp., illus., printed, 7s. 6d. (about US\$1.05). Her Majesty's Stationery Office, 13A Castle St., Edinburgh 2, Scotland. Investigations on commercial and research vessels in the North Atlantic have shown that male halibut normally spawn for the first time at sizes ranging from 28 to 40 inches and females from 39 to 54 inches. Spawning takes place mainly in April and May but evidence of an earlier spawning, based on the occurrence of well developed roes in fish caught in December 1952, is discussed. In the early years of the halibut's life, male and female fish are present in equal numbers but with increasing age and size the females outnumber the males and all the large fish of 60 inches and over were found to be females. The length/weight relationship is studied. Halibut of the same length may vary greatly in weight. This is due to various factors including anatomical, seasonal, and regional differences. The significance of these results is considered in relation to the halibut fisheries, and the need for conservation of such a valuable resource is noted.

HERRING:

Prospects for the 1959-60 British Columbia Herring Fishing Season, by F. H. C. Taylor, Circular

No. 53, 4 pp., processed. Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada, October 1959. The fifteenth in a series of annual circulars dealing with the prospects of the British Columbia herring fishery. These forecasts are made to aid in the formation of effective management policies and to help the industry use the resources more economically. The data are derived from prediction of the carry-over from the estimated abundance in the previous season and the expected new recruitment.

IDAHO:

Statewide Fishing Harvest Survey, 1957, by Forrest R. Hauck, Federal Aid to Fisheries Project F18-R-4, 11 pp., processed. Department of Fish and Game, Boise, Idaho, August 15, 1958.

INTERNATIONAL GEOPHYSICAL YEAR:

"The IGY World Data Centers for Oceanography," by J. R. Lumby, article, *Texas Journal of Science*, vol. XI, no. 3, September 1959, pp. 259-269, illus., printed, single copy \$1.25. *Texas Journal of Science*, Box 7984, University Station, Austin, Tex.

JAPAN:

Bulletin of Tokai Regional Fisheries Research Laboratory, no. 24, June 1959, 91 pp., illus., printed in Japanese with English summaries. Tokai Regional Fisheries Research Laboratory, Tsukishima, Chuo-ku, Tokyo, Japan. Includes, among others, these articles: "Some Studies on Set Net Fishing Ground," by M. Nomura; "Studies on Trawl Net. III—Observation of the Configuration of a Trawl Net Using a Large Sized Model," by S. Takayama, T. Koyama, and H. Taketomi; and "Prevention of the Adhesion of Canned Salmon Meat," by T. Takahashi and M. Takei.

Collected Reprints, 1958 (from the Tokai Regional Fisheries Research Laboratory), 251 pp., illus., printed in Japanese with English summaries. Tokai Regional Fisheries Research Laboratory, Tsukishima, Chuo-ku, Tokyo, Japan. Contains, among others, these reprints of articles published by Laboratory scientists outside the publications of the Laboratory: "Fluctuations in the Fishery for Young Sardine off Shichiri-Mihama, Kii Peninsula (One of the Data Relevant to Fluctuations of the Sardine Stock in Japanese Waters)," by Z. Nakai; "A Trial on Estimating the Abundance of Population of the Pacific Sauri, *Cololabis saira* (Brevoort)" and "On the Availability of the Sardine, *Sardinops melanosticta*, Population Caught by Drift Gill Nets in the Western Japan Sea," by T. Doi; "An Attempt for Determining the Swimming Speed of Fish Schools by the Fish Finder (Preliminary Report)," by S. Kawada, Y. Tawara, and C. Yoshimuta; "An Attempt for Detecting the Swimming Course of Fish Schools at a Set Net Fishing Ground by Fish Finder (Preliminary Report)," by S. Kawada and Y. Tawara; "On the Change in Strength of Netting Cords Immersed in the Sea. II—Relation Between the Strength of Tarred Synthetic Cords and the Temperature, and Comparison of Power of These Cords Changing When

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Immersed in the Sea," by Y. Shimozaki and Y. Nozawa; "On the Nature of the Streaming Birefringence Observed in the Aqueous Extracts of Squid Muscle. II--Dissolution of 'Myosins' in the Aqueous Extract," by M. Migita and J. J. Matsumoto; "On Purified M-Actomyosin of Squid Muscle," "Some Notes on M-Actomyosin of Squid Muscle," "On Actomyosin of Squid Muscle from Salt-Extract. Preparation of Actomyosin," "On the Protein Composition of Squid Muscle," and "The Effect of ATP on the Viscosity of Squid Actomyosin," by J. J. Matsumoto; "On a Specific Behavior of 'Myosins' of Squid Muscle. I--Precipitability of 'Myosins'," by M. Migita and others; "Influence of Urea up on the Binding of Some Ionic Dyes to Proteins," by M. Migita and S. Otake; "A Comparative Study on the Extractability of Muscle Proteins of Some Animals," by M. Migita, J. J. Matsumoto, and N. Aoe; "Study on the Green Meat of Tuna. I--Quantitative Differences of Vitamin B Group and Minerals Between the Green and the Normal Meat of Precooked Tuna," "Study on the Green Meat of Tuna. II--Quantitative Differences of Vitamin B Group and Minerals in Kidney Between Green and Normal Bodies of Yellowfin Tuna," and "Study on the Green Meat of Tuna. III--A Simple Method to Distinguish Greened Body from Normal One Before Cooking," by S. Hirao and others; "The Pantothenic Acid Content of Fish and Shellfish" and "The Folic Acid Content of Fish and Shellfish," by H. Higashi and others; "Fat and Vitamin A in the Intestine of Lamprey, *Entosphenus japonicus* Martens," by J. Yamada; "The Softening Deterioration of Fish Sausage. I--Some Chemical and Microscopical Aspects," by H. Uchiyama and T. Tanaka; "The Softening Deterioration of Fish Sausage. II--Microbiological Studies of the Softening Deterioration," by M. Yokoseki, H. Uchiyama, and T. Mamizuka; "The Softening Spoilage of Fish Sausage. III--An Anaerobic Starch Digestion by *Bacillus circulans* isolated from Softened Part of Fish Sausage and Other *Bacillus* species," by H. Uchiyama, M. Yokoseki, and K. Motohashi; "Studies on the Internal Spoilage of Fish-Jelly Products. III--Measurement of Oxidation-Reduction Potential in Fish-Jelly Products," by M. Yokoseki; and "Chemical Properties of Oils in Gamma-Radiated Fish Meat and Products. Part I," by T. Kaneda, H. Sakai, and S. Ishii.

LAKE TROUT:

"Mortality of Trout Caused by Hooking with Artificial Lures in Michigan Waters 1956-57," by David S. Shetter and Leonard N. Allison, Miscellaneous Publication No. 12, 15 pp., illus., printed. Michigan Department of Conservation, Institute for Fisheries Research, Ann Arbor, Mich., August 1958.

MARINE SCIENCE:

"Field Notes from the 1959 Eastern Pacific Cruise of the *Stella Polaris*," by E. Yale Dawson and Palmer T. Beaudette, article, *Pacific Naturalist*, vol. 1, no. 13, November 10, 1959, illus., printed in English with Spanish summary. The Beaudette Foundation for Biological Research, Box 482, RFD 1, Solvang, Calif. With

present day interest in physical sciences and space-age technology, the natural sciences have been relegated to a position of relative unimportance by the public. This article is one of the series published by the Beaudette Foundation, established in 1958 to encourage and engage in research in the neglected field of marine biological systematics, ecology, and geography. Contains extracts from the writers' logs of the voyage of the *Stella Polaris* from the Gulf of Panama to Jalisco, Mexico, in the spring of 1959. Significant observations are recorded of marine plants, coralline algae, and organic production resulting from coastal upwellings.

MARINE VEGETATION:

Guide to Marine Vegetation Encountered during Herring Spawn Surveys in Southern British Columbia, by Donald N. Outram, Circular No. 44, 18 pp., illus., printed. Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada, December 1957.

MARYLAND:

Exploratory Survey of Tidewater Bottom, Somerset County, Maryland (A Preliminary Report), by J. H. Manning and H. T. Pfitzenmeyer, Resources Study Report No. 12, 6 pp., illus., printed. Maryland Department of Research and Education, Chesapeake Biological Laboratory, Solomons, Md., February 1958.

NETS:

Monofilament Nylon Web for Salmon Gill Nets, 1959, by P. J. G. Carrothers, Circular No. 54, 4 pp., processed. Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada, October 1959. Describes a new type of nylon monofilament netting, Perlon, used experimentally by the commercial salmon gill-net fleet out of Steveston, B. C., in the summer of 1959. This type of netting has the advantage over the multifilament nylon netting of being less visible in the water. Greater catches were reported with the Perlon than with multifilament nylon netting. However, disadvantages such as knot slippage must be overcome before the new type netting can be fully accepted for salmon gill nets.

"Über Einige Erfahrungen bei der Anwendung von Randparallelen Maschen für Leitwehre und Flugel" (Experience with the Use of Parallel Meshes along the Rim for Leading Nets and Wing), by K. Schmidt, article, *Deutsche Fischerei Zeitung*, vol. 5, no. 4, April 1958, pp. 105-107, illus., printed in German. Neumann Verlag, Radebeul, Dresden, E. Germany.

NEW YORK:

The Present Program of the Marine Fisheries Unit of the New York State Conservation Department and a Proposed New Program, by Alfred Perlmuter, 10 pp., processed. Marine Fisheries Unit, New York State Conservation Department, Freeport, New York, June 14, 1957.

OCEAN PERCH:

"Red Flesh in Redfish, *Sebastes marinus*," by W. Templeman and E. J. Sandeman, article, *Journal*

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of the Fisheries Research Board of Canada, vol. 15, no. 4, July 1958, pp. 695-700, printed. Journal of the Fisheries Research Board of Canada, University of Toronto Press, Ottawa, Canada.

Redfish Distribution in the North Atlantic, by W. Templeman, Bulletin No. 120, 173 pp., printed, \$1.75. Queen's Printer and Controller of Stationery, Ottawa, Canada, 1959.

PARASITES:

A New Microsporidian Parasite from the Pink Shrimp (PENAEUS DUORARUM), by Edwin S. Iversen and Raymond B. Manning, 3 pp., illus., printed. (Reprinted from Transactions of the American Fisheries Society, vol. 88, 1959, pp. 130-132.) Librarian, Colorado A & M College, Fort Collins, Colo.

PLANKTON:

The Chaetognaths of the Eastropic Expedition, with Notes as to Their Possible Value as Indicators of Hydrographic Conditions, by Paul N. Sund and James A. Renner, 44 pp., illus., printed in Spanish and English. (Reprinted from Inter-American Tropical Tuna Commission Bulletin, vol. 3, no. 9). Inter-American Tropical Tuna Commission, La Jolla, Calif., 1959.

SALMON:

On the Causes of Fluctuation in the Number of Pacific Salmon and the Tasks in the Rational Use of Stocks, by R. S. Semko, 44 pp., processed. (Translated from Papers of the Conference on Questions of Fisheries, 1951.) Department of State, Washington 25, D. C.

The Food of Pacific Salmon in the Northwestern Pacific Ocean, by L. D. Andrievskaya, Translation Series No. 182, 16 pp., illus., processed. (Translated from Materialy po Biologii Morshovo Perioda Zhizni Dalnevostochnykh Lososel, 1957, pp. 64-75.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada, 1958.

SARDINES:

"Metodos de Cozimento das Sardinhas I" (Methods of Cooking Sardines, Part I), by F. Lopez-Capont, article, Conservas de Peixe, vol. 13, no. 146, May 1958, pp. 20-22, printed in Portuguese. Conservas de Peixe, Reguero dos Anjos 68, Lisbon, Portugal.

SEA LAMPREY:

Distribution of Sea Lamprey Ammocoetes in Michigan Tributaries of Lake Superior, 1955-1957, by Thomas M. Stauffer and Martin J. Hansen, Miscellaneous Publication No. 11, 25 pp., illus., printed. Michigan Department of Conservation, Institute for Fisheries Research, Ann Arbor, Mich., August 1958.

SEALS:

The Economics of Seals in the Eastern Canadian Arctic, by I. A. McLaren, Circular No. 1, 94 pp., processed. Fisheries Research Board of Canada, Arctic Unit, Montreal, Canada, 1958.

SHAD:

Distant Recaptures of Shad (ALOSA SAPIDISSIMA) Tagged in Quebec, by Vadim D. Vladkov, Contribution No. 54, 18 pp., illus., printed in English with French summary, 50 Canadian cents. (Reprinted from Le Naturaliste Canadien, vol. LXXXIII, no. 10, October 1956.) Department of Fisheries, Rm. 127, E. Bldg., Quebec, Canada, 1957.

SHRIMP:

Prawn Investigations in Eastern Australia, by A. A. Racek, Research Bulletin No. 6, 57 pp., illus., printed. State Fisheries, Chief Secretary's Department, New South Wales, Sydney, Australia, 1959.

A Shrimp Survey by the "Investigator No. 1" April 1953, Circular No. 28, 5 pp., processed. Fisheries Research Board of Canada, Pacific Biological Station, Nanaimo, B. C., Canada, May 1953.

SPAIN:

Industrias Derivadas de la Pesca, Año 1956 (Fishery Industries, 1956), Deposito Legal M. 7619--1958, 128 pp., printed in Spanish. Instituto Nacional de Estadística, Madrid, Spain. Covers Spanish canning, curing, and byproducts industries. Gives data on plants, number of employees, products produced, raw material and species used, and other data for 1956.

Investigacion Pesquera, vol. XIV, August 1959, 135 pp., illus., printed in Spanish with English summaries. Instituto de Investigaciones Pesqueras, Universidad de Barcelona, Spain. Includes, among others, these articles: "Consideraciones Acerca del Crecimiento de la Caballa (Scomber scombrus L.) en el Mediterraneo Espanol--Parte I" (Observations in Regard to Growth of the Horse Mackerel in the Spanish Mediterranean), by Carlos Bas Peired; and "Aparicion en la Costa Sudatlantica Espanol de Atunes Marcados en Noreuga" (Appearance on the South Atlantic Coast of Spain of Tuna Tagged in Norway), by Julio Rodriguez-Roda.

TARIFF AND TRADE:

United States Import Duties Annotated for Statistical Reporting (For Use in Preparing Import Entries and Withdrawals), with Classification for Countries (Schedule C) and United States Customs Districts and Ports (Schedule D), January 1, 1960 Edition, 672 pp., processed, \$4. Bureau of the Census, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) A simplified guide for use by importers in reporting information to collectors of customs from which monthly reports on foreign trade are compiled. The guide is a reproduction of United States Import Duties (1958) in tariff paragraph arrangement but annotated to include the statistical detail and the new 8-digit statistical reporting numbers required to be reported on the entry forms starting January 1960. A convenient

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index of commodities is included for finding the appropriate tariff paragraph. The new guide is intended to facilitate supplying the statistical requirements on entry forms by presenting the requirements in terms of the Tariff Act rather than in terms of the very different Schedule A arrangement as in the past.

TRADE LISTS:

The Office of Economic Affairs, Bureau of Foreign Commerce, U. S. Department of Commerce, Washington 25, D. C., has published the following mimeographed trade list. Copies may be obtained by firms in the United States from that office or from Department of Commerce field offices at \$2 a copy.

Oils (Animal, Fish, and Vegetable)--Importers, Dealers, Producers, Refiners, and Exporters--Chile, 9 pp. (October 1959). Lists the names and addresses, size of firms, and types of products handled by each firm. Includes firms dealing in fish oils and whale oils.

TROPICAL FISH:

The Status and Distribution of the Fishes of the Family Microdesmidae in the Western Atlantic, by C. Richard Robins and Raymond B. Manning, Contribution No. 214, 4 pp., printed. (Reprinted from *Journal of the Washington Academy of Sciences*, vol. 48, no. 9, September 1958, pp. 301-304.) The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

TUNA:

Techniques Used in the Tagging of Yellowfin and Skipjack Tunas in the Eastern Tropical Pacific Ocean during 1955-1957, by Gordon C. Broadhead, 7 pp., illus., printed. (Reprinted from *Proceedings of the Gulf and Caribbean Fisheries Institute*, Eleventh Annual Session, November 1958, pp. 91-97.) Inter-American Tropical Tuna Commission, La Jolla, Calif.

TURKEY:

Balık ve Balıkçılık (Fish and Fishery), vol. 7, no. 11, November 1959, 33 pp., illus., printed in Turkish with table of contents in English. Contains, among others, these articles: "Fishing in Greece and Turkey's Fish Export to this Country," by Cihat Renda; "Trawl Fishing (Part II)," by İlham Artuz; "The Necessity of Quality Control in Fish Canning Industry," by A. Baki Uğur; and "Sponge Fishing on the Aegean Coasts," by Tosun Sezen.

TURTLES:

The Green Turtle (CHELONIA MYDAS MYDAS) in Florida, by Archie Carr and Robert M. Ingle, 6 pp., printed. (Reprinted from *Bulletin of Marine Science of the Gulf and Caribbean*, vol. 9, no. 3, September 1959, pp. 315-320.) The Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla. Records the first documented observations of nesting emergences of the Atlantic green turtle on the coast of North America. Eggs from one nest were hatched and the young are now in collections of

the University of Florida. The possibility of using such Florida-oriented hatchlings in a future restocking project is discussed.

UNITED KINGDOM:

Sea Fisheries Statistical Tables, 1958, 36 pp., printed, 4s. (56 U. S. cents). Her Majesty's Stationery Office, York House, Kingsway, London W. C. 2, England, 1959. Consists principally of statistical tables showing the quantity, total value, and average value of fish and shellfish production in England and Wales by species, region, and method of capture for 1958. Break-downs of catches by vessels 40 feet and over, demersal landings, and pelagic landings are included. Data on foreign trade are shown. Information on the number of fishermen, vessels, and vessels by stations, methods, and gross tonnage are also given.

VENEZUELA:

"La Pesca Fluvial en el Desarrollo de la Economía Rural" (Inland Fishery in the Development of the Rural Economy), by Felipe Martín Salazar, article, *El Agricultor Venezolano*, vol. 23, no. 210, July 1959, pp. 13-17, illus., printed in Spanish. Ministerio de Agricultura y Cria, Caracas, Venezuela. A comprehensive article covering fish culture, fishery conservation, and other aspects of the inland fisheries of Venezuela.

VESSELS:

"Motor Tuna Clipper Balbaya," article, *Marine Engineer and Naval Architect*, vol. 81, October 1958, pp. 367-368, illus., printed. White Hall Technical Press, Ltd., 4 Catherine Place, London S. W. 1, England.

"A Nuclear Whaler," by G. W. Brokaw and others, article, *Nuclear Engineering*, vol. 3, November 1958, pp. 47-52, illus., printed. Temple Press, Ltd., Bowling Green Lane, London E. C. 1, England.

VIRGIN ISLANDS:

The Commercial Fishery of St. John, Virgin Islands, by C. P. Idyll, no. 8903, 14 pp., processed. The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla., November 1959. Covers a short survey of the commercial fishery of St. John as a part of the study of marine resources of that area. The principal objectives of the survey were to discover how much commercial fishing was being done, whether there appeared to be any signs of depletion of the fish stocks, and whether the commercial fishery was likely to affect sport fishing. Recommendations are that the commercial fishery should be encouraged to expand, that statistics of catch and fishing effort should be kept, and that marketing facilities should be created.

WALRUS:

The Walrus in the Canadian Arctic, by A. W. Mansfield, Circular No. 2, 13 pp., processed. Fisheries Research Board of Canada, Arctic Unit, Montreal, Canada, 1959.

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WASHINGTON:

Washington State Department of Fisheries, 68th Annual Report, 1958, 303 pp., illus., printed.
Washington State Department of Fisheries, 4015 20th Ave., W., Seattle 99, Wash. This report includes information on the activities of the Department of Fisheries during 1958 in the fields of fish farming, marine farming and stream improvement, and enforcement. Sections are also included on otter trawling, offshore trolling investigations, the herring fishery, coastal investigations, Columbia River fisheries, contributions of the Columbia River, sports fishery, and salmon escapement during 1958. Specialized problems are dealt with in chapters on the menace of dogfish shark, commercial clamming, coastal pink shrimp fishery, program for oyster culture, oyster reserve management, oyster reproduction, and oyster rehabilitation research. Reprinted in its entirety is an article, "Salmon of the Pacific," by R. D. Hume, published originally in 1893. A considerable portion of the report is devoted to the 1958 fisheries statistical report containing data on commercial landings and fishway counts.

WHALING:

"Newfoundland Whaling," by Bruce Woodland, article, *Trade News*, no. 12, no. 4, October 1959, pp. 3-5, illus., processed. Director of Information and Educational Service, Department of Fisheries, Ottawa, Canada. Gives a short account of whaling in Newfoundland, past and present. The loss by fire of a processing plant at Hawkes Harbour leaves only one plant on the Island, at Dildo, Trinity Bay, which confines its operations to processing the meat of pothead and Minke whales and small quantities of oil. The history of whaling in Newfoundland began in the early seventeenth century with the colonization by Sir Richard Whitbourne. The industry represented a major segment of the economy of Newfoundland during most of the nineteenth century but began to decline with the development of petroleum resources. At present, whaling is regulated by the International Whaling Convention of 1946, to which Canada is signatory. The licensing of whaling factories which operate only as shore-based installations, is the responsibility of the individual provinces.

YELLOW PERCH:

The Yellow Perch, Its Life History, Ecology, and Management, by Elmer Herman and others, Publication 228, 12 pp., illus., printed. Wisconsin Conservation Department, Madison 1, Wis., 1959.

YELLOW PIKE:

The Walleye, Its Life History, Ecology, and Management, by Wallace Niemuth, Warren Churchill, and Thomas Wirth, Publication No. 227, 12 pp., illus., printed. Wisconsin Conservation Department, Madison 1, Wis., 1959.

YEARBOOKS AND DIRECTORIES:

Food, The Yearbook of Agriculture, 1959, 750 pp., illus., printed, \$2.25. U. S. Department of Agriculture, Washington 25, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) A comprehensive report on the production, processing, distribution, marketing, and preparation of foods, together with principles of nutrition and Government regulation of the food industry. Each chapter is written by an expert or experts in that particular food field, and the chapters are grouped under section headings of food backgrounds, nutrients, health, needs, quality, preparation, costs, trends, learning, and programs. Included in the chapter on food quality is a section on "Fish and the Fishing Industry," by Andrew W. Anderson, Assistant Director of the U. S. Bureau of Commercial Fisheries. The author discusses the nutritive value of fishery products, the program for establishing standards for fishery products, and the operation of a voluntary inspection system in the industry. He describes the activities of the Department of the Interior in behalf of the fishing industry and in the interest of the consuming public. Mention is made of the Fish and Wildlife Act of 1956 and the Saltonstall-Kennedy Act of 1954 and the accomplishments achieved by their implementation, towards both the prosperity of the fishing and allied industries and the welfare of the consumer. There are several illustrations showing world catch of fishery products, 1957; utilization of the U. S. commercial catch in 1958; estimated value of fishery products, 1957; a purchasing guide showing available forms of marketing fish; and other similar data.

YUGOSLAVIA:

Morsko Ribarstvo (Marine Fisheries), no. 9, Sept. 1959, 20 pp., illus., printed in Yugoslavian with the contents of main articles in English. Morsko Ribarstvo, V. Gagata 3, P. O. B. 185, Rijeka, Yugoslavia. Contains, among others, the following articles: "Influence of the Intensity of Fishing upon the Composition of Fish Colonies," by Sime Zupanovic; and "Influence of the Forest upon the Production in Coastal Waters," by Miljenko Buljan.

Morsko Ribarstvo (Marine Fisheries), no. 10, October 1959, 20 pp., illus., printed in Yugoslavian with the contents of main articles in English. Morsko Ribarstvo, V. Gagata 3, P. O. B. 185, Rijeka, Yugoslavia. Contains, among others, the following articles: "The Behaviour of Phytoplankton during Fertilization Experiments," by Tereza Pucher-Petkovic; and "Experimental Tank for Live Bait," by Radosna Muzinic. Also contains a report on the catching of *Clupea sprattus* by using submarine lighting, nets, and aspirators in the Caspian Sea; and a report, by Kresimir Seif, from the X-International Congress of Refrigeration held in Copenhagen, August 19-26, 1959.



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ANTIGENS MAY IDENTIFY SALMON RACES

The Bureau of Commercial Fisheries Biological Laboratory, Seattle, Wash., tested blood samples from 110 Bristol Bay red salmon and 65 red salmon taken by the research vessel Pioneer on the high seas in the North Pacific in 1958. Results of the tests show certain antigens to be present in 98 percent of the American fish. In previous tests these same antigens were found to be absent from 98 percent of the Asian fish. The incidence of these antigens in the 1958 Bristol Bay reds confirmed past findings. Fifty-two of the 65 blood samples taken from salmon collected on or west of the present abstention line in the Pacific Ocean by the Pioneer in 1958 were determined to be characteristic of salmon of American origin.

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* * * * *

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CANNING INDUSTRY CELEBRATES 150TH ANNIVERSARY

This is the year the Canning Industry celebrates its 150th birthday, and it seems only appropriate to light a special birthday candle for William Underwood the man who started canning in the United States.

During Napoleonic Wars, French armies traveled far from home base. The foreign lands they invaded often were stripped of forage by retreating enemies to such an extent that the problem of feeding the troops was acute. Armies suffered more casualties from bad food and starvation than from enemy muskets.

The French Government offered a prize of 12,000 francs to the person who could develop a method of preserving food effectively. Nicholas Appert, a Parisian confectioner, pickler, and vintner took up the exciting challenge. He worked at it for 14 years, and finally in 1809 he was successful. He found a method of preserving food so that it would keep, and in 1809 Napoleon presented him the award of 12,000 francs.

Appert packed his food like vintage wines, in bottles. He partially cooked the food, then placed it in bottles which were corked, wired, and submerged in boiling water. Without knowing it, he had sterilized food, stopping bacterial spoilage. The process worked, but the fragile glass containers often broke in transit.

A year later, in 1810, an Englishman named Peter Durand added a contribution to the infant preserving business. Durand took a clue from medieval workmen who in the 13th century had discovered that by dipping a sheet of iron into molten tin, they could stop corrosion and rust. Durand developed the "canister," an iron container plated with tin, with a soldered cover. He packed his "tin canister" with meat and soon one Britisher, then another, and another were eating his canned or "embalmed" meat as they jokingly called it.

In a pickling establishment in London at that time worked an ambitious young man named William Underwood, who was much intrigued by this new development of canning food. His ambition and adventurous spirit caused him to leave England and sail to America in 1817, eventually settling in Boston.

Here, where vessels were sailing every day for distant ports, and taking with them large stores of provisions and food, 30-year-old William Underwood started a canning plant at the edge of Boston Harbor, on what is now called Russia Wharf. The year was 1821, and the company which Underwood started is still owned by the Underwood family, and is America's oldest canning company.

William Underwood began his business by putting berries and fruit in glass jars. People were suspicious, however, of these new "preserved foods." They couldn't believe that food in jars could stay fresh and sweet for any length of time. But William Underwood found good customers for preserved foods among the seagoing men who needed provisions for long voyages around the Horn and to distant ports.

It was in 1939 that Underwood first used canisters to hold his variety of preserved foods. In the old ledgers of the Underwood Company, the number of canisters sold each day appears on page after page, but at one point a clerk who tired of continually writing that long word "canister" abbreviated it to "can," and that is how the word "can" came into being.

In those early days, the enterprising Underwood Company packed oysters and lobsters and salmon, some of which were sent to the West Coast where a great gold rush was going on. In fact, the first gold to reach the East Coast from California arrived in an emptied Underwood salmon can. Today the same company packs 16 specialized products, including sardines in tomato sauce, sardines in mustard sauce, sardines in salad oil, clam chowder, clam juice, and whole soft-shell clams.



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ROBERT H GIBBS JR

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MARCH 1960

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Washington, D.C.



COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries
prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
H. M. Bearse, Assistant Editor

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COVER: Packing and inspection line of a large, modern breaded shrimp packing plant in Tampa, Florida. This particular phase of the shrimp industry has become important only in the past several years. Most of the breaded shrimp plants in the United States, like this one in Tampa, have contracted for the U. S. Department of the Interior or voluntary inspection service (USDI). Most of the frozen breaded shrimp packed and sold today is produced under USDI inspection.

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PROCESSING AND QUALITY STUDIES OF SHRIMP HELD IN REFRIGERATED SEA WATER AND ICE

Part 1 - Preliminary Observations on Machine-Peeling Characteristics and Product Quality

By Jeff Collins*

ABSTRACT

Preliminary information is given on (1) the peeling characteristics of shrimp held in refrigerated sea water, (2) the leaching effect on shrimp of the washing action of the machine peeler, and (3) the effect of certain holding and processing variables on the quality of the canned product.

BACKGROUND

Two processors at Wrangell, Alaska, installed mechanical peelers in the winter of 1957-58, thus introducing to Alaska a mechanized process for shrimp canning. Along with these developments, industry expressed interest in the refrigerated-sea water system as a method for holding the shrimp prior to processing.

Considerable literature is available detailing the characteristics of the refrigerated-sea water system for holding fish. This generally indicates that there are considerable advantages inherent in the system for certain fish. However, only limited information (Higman and Idyll 1952; Higman, Idyll, and Thompson 1953; Roach and Harrison 1954) has been published on the holding of shrimp.

The literature indicates that the advantages of the system for holding shrimp may include (1) a greater freedom at sea to fish more distant grounds, (2) less crushing and breakage, (3)



Fig. 1 - Portable laboratory refrigerated-sea water unit.

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reduced labor costs, both on the vessel and at the plant, and (4) a safety factor to the plant operation in that a more consistent and economical processing schedule can be maintained. Before the potential advantages of the system could be evaluated, it was first necessary to determine whether shrimp held in refrigerated sea water would mechanically peel satisfactorily, since no large-scale production of the small shrimp is feasible in Alaska without the aid of the mechanical peeler.

The primary objective of the work reported here was to investigate the peeling characteristics of pink shrimp held in refrigerated sea water. Secondary objectives were to make a preliminary study of (1) the changes in the composition of the shrimp due to the leaching action of the water used in machine peeling and (2) the effect of refrigerated sea water on black discoloration of the canned shrimp.

PEELING CHARACTERISTICS

In the investigation of peeling characteristics, tests were carried out using a portable laboratory refrigerated-sea water unit in a commercial processing plant in Wrangell.

EQUIPMENT AND METHOD OF PROCESSING: In this subsection, refrigerated sea water is defined, and the tank that was used for holding the refrigerated sea water, the machine for peeling the shrimp, and the method of processing them are described. The normal plant procedure for holding the shrimp in ice is also given.

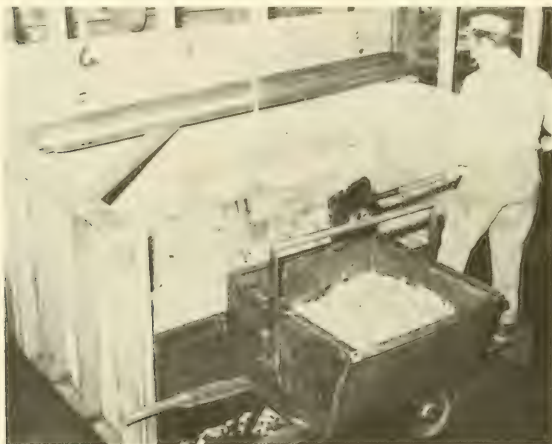


Fig. 2 - Shrimp being removed from an aging bin prior to machine-peeling.

Refrigerated Sea Water (RSW) is the system in which an artificially-prepared solution of 3-percent (by weight) sodium chloride (canner's grade) dissolved in potable water is held in a tank constructed of an inert material and maintained at $30^{\circ} \pm 1^{\circ}$ F. by means of mechanical refrigeration, suitable circulation of brine, and suitable insulation. Shrimp is held at a 1 to 1 ratio of shrimp to brine unless otherwise indicated. This ratio is optimum for shrimp in that it allows the brine to submerge the shrimp and only enough excess for proper circulation.

Holding Tank: The portable laboratory holding tank used (fig. 1) was constructed by coating the inside of a 55-gallon steel drum with white Fiberglass-Fiberlay. Copper tubing (100 feet in length and $\frac{1}{2}$ inch in diameter) was tightly wrapped on the outside of the drum and sealed to it with a thermomastic. The drum was then insulated with 3 inches of glass wool and covered with sheet metal. The refrigeration was supplied by a $\frac{3}{4}$ -horsepower compressor with Freon 12 passing through an

Refrigerated Sea Water: Refrigerated sea water is a watery solution for holding fish or shellfish at about 30° F. It consists of a water-cooling medium, a tank to hold it, and a source of refrigeration. Since "refrigerated sea water" has been applied to several variations, the standard system and holding conditions described in this and subsequent papers is defined as follows: Refrigerated sea water (RSW) is the

expansion valve. The brine was circulated from the bottom center of the drum (false bottom with screened outlet) in polyvinylchloride pipe ($\frac{3}{4}$ inch in diameter) through a 1/8-horsepower magnetic circulator and back into the top of the drum through a perforated peripheral spreader pipe located just under the surface of the brine. The unit had a working capacity of 200 pounds of refrigerated sea water and 200 pounds of shrimp.

Icing Procedure: The shrimp are normally unloaded at the plant on the same day that they are caught. For optimum machine-peeling, such shrimp require a controlled aging period to release the meats from the shells prior to peeling. Aging is accomplished by layering the shrimp with flake ice in 4 by 8 foot wooden bins to a depth of about 3 feet. After 40 to 48 hours, the shrimp are transferred from the bins to the machine peeler.



Fig. 3 - Shrimp in the process of being machine-peeled.

Peeling Machine: The particular peeling machine used was a Model A peeler manufactured by the Peelers Company.

Processing: After the shrimp were machine-peeled, the meats dropped onto a continuous stainless-steel woven belt and passed through a covered steam box for 90 seconds. The meats, after being given this precook, passed through a rotating tunnel blower, where loose shell was removed, and onto a table for final inspection prior to seaming and retorting.

EXPERIMENTAL PROCEDURE AND RESULTS: Pink shrimp (*Pandalus* sp.) were used, since they are the species that make up the bulk of the shrimp that are machine-peeled in Alaska. In this study on machine peeling, three experiments were performed.

Experiment 1: Three hours after being caught 200 pounds of pink shrimp were placed in refrigerated sea water and held for 18 hours. These shrimp, although of excellent quality and easily peeled by hand, did not peel properly by machine, since the shells had not released from the meats sufficiently.

Experiment 2: The shrimp were held in refrigerated sea water for 40 hours. After this length of time, the shrimp were still of excellent quality, were easily peeled by hand, and were peeled satisfactorily by machine.

Experiment 3: The shrimp were held for 40 hours in 6-percent brine (Roach and Harrison 1954). Although these shrimp did not appear to be markedly different from those in the previous run, the operator of the machine found that the shrimp peeled slightly better. It was his opinion that shrimp held for 40 hours in either refrigerated sea water (as defined here) or in 6-percent brine would peel satisfactorily in the machine given enough shrimp to adjust the machine properly.

LEACHING ON PEELER

Since the shrimp were sprayed with a large volume of water during the peeling operation (fig. 3), it was of interest to determine the extent of leaching of certain soluble constituents under these conditions. For this study, (1) fresh hand-peeled shrimp, (2) shrimp held in refrigerated sea water for 40 hours and then hand-peeled, and (3) shrimp held in refrigerated sea water for 40 hours and then machine-peeled were frozen for later analysis. These analyses were for total chloride, total nitrogen (Association of Official Agricultural Chemists 1955), and total volatile base (Stansby, Harrison, Dassow, and Sater 1944).

Table 1 - Change in Certain Shrimp Constituents as a Result of Holding Shrimp in Refrigerated Sea Water (RSW) and Peeling Them by Machine			
Treatment of Sample	Total Chloride Content As % NaCl	Total Volatile Base Mg.N/100 g.	Total Nitrogen Content Percent
Fresh, hand-peeled shrimp . . .	0.5	-	-
Shrimp held 40 hrs. in RSW then hand-peeled	1.4	7.2	3.0
Shrimp held 40 hrs. in RSW then machine-peeled	0.7	6.3	2.6

The data are shown in table 1. They indicate that leaching did occur when shrimp were machine-peeled. As can be noted from the table, for example, most of the salt that was absorbed when the shrimp were held in refrigerated sea water for 40 hours was leached out during the subsequent peeling operation. Both the total volatile base and the total nitrogen content also decreased as a result of machine-peeling.^{1/}

BLACK DISCOLORATION

The black discoloration of canned shrimp has been a problem of long standing. It is generally accepted that the use of poor-quality shrimp will result in a discolored product. From the published literature on the use of refrigerated sea water for the holding of fish, it was expected that shrimp so held would be of better raw quality than when held in ice (time of holding being the same). It also seemed possible that discoloration might be less for shrimp held in refrigerated sea water. Therefore, preliminary tests were carried out during the peeling experiments, previously described, in order to determine the relative effect that aging in ice or aging in refrigerated sea water would have on black discoloration.

In these experiments, shrimp held either in ice (the normal plant procedure) or refrigerated sea water were processed both with the addition of citric acid prior to retorting, which was the normal plant procedure, and without the addition of citric acid but with the addition of brine. The acid, if used, was added by flooding the cans, prior to seaming, with 4.8-percent sodium chloride brine containing 0.36-percent citric acid. All cans were then stored at room temperature and subsequently examined at various intervals up to 7 months.

The darkening characteristics for the cans processed without citric acid are arranged in order of increasing tendency to darken as follows:

^{1/}It might be argued that the data are artifacts caused by moisture uptake rather than a true leaching. Moisture, of course, is absorbed by the meats, but if the "loss of constituents" is caused only by moisture uptake, then the ratios of the initial to the final values of the three analyses would be constant and equal to each other. Since this was not the case, leaching must also have occurred.

<u>Holding Conditions</u>	<u>Relative Darkening</u>
Iced shrimp, 40 hours aging, good quality	very slightly dark
RSW shrimp, 18 hours aging, 3-percent brine, good quality	slightly dark
RSW shrimp, 40 hours aging, 3-percent brine, good quality	moderately dark
RSW shrimp, 40 hours aging, 6-percent brine, good quality	moderately dark
Iced shrimp, 40 hours aging poor quality	very dark

In the samples processed with the addition of citric acid, the acid prevented darkening except for one ice-held sample that was of borderline freshness.

QUALITY

Although observations in the course of the present work indicated that holding shrimp in refrigerated sea water yielded a product of satisfactory quality, the work was carried out under favorable conditions that may not always be obtainable. Quantitative data are therefore needed regarding the effect of holding and processing variables before the relative usefulness of refrigerated sea water can be evaluated for Alaska shrimp. Accordingly, data on such factors will be presented in subsequent reports in this series of articles.

CONCLUSIONS

1. Pink shrimp machine-peeled satisfactorily after being held 40 hours in refrigerated sea water containing either 3-percent or 6-percent brine.

2. Salt, total volatile base, and total nitrogen contents of the shrimp were reduced by the leaching action of water during machine-peeling.

3. When shrimp were canned without the addition of citric acid, black discoloration increased with (1) loss in quality of ice-held shrimp, (2) time of holding in refrigerated sea water, and (3) increased brine concentration. Adding citric acid prevented darkening except for one ice-held sample of borderline freshness.

4. Before the relative usefulness of the refrigerated-sea water system can be evaluated for Alaska shrimp, quantitative data are needed regarding the quality of the product as affected by holding and processing variables.

Note: The author wishes to express his appreciation to Messrs. B. Engdal and H. Sundberg for their helpful discussions and for making the facilities of the Harbor Seafoods Company at Wrangell, Alaska, available for these experiments.

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BRAIDED SYNTHETIC TWINES AND THEIR USE IN THE NEW ENGLAND TRAWL FISHERY

By Michael Ruggiero*

BACKGROUND

The chemical revolution, which has brought about many changes in many industries, has also reached the fishing industry. Its effects can be seen on the decks and in the enginerooms of every vessel of the fishing fleet as well as in every fishery shore installation in the form of improved products, supplies, and materials. The introduction of synthetically-produced or improved fibers is only one part of this major revolution, but a part which will become increasingly important in the future.

Development of practical applications for synthetic fibers was speeded greatly by World War II research, but development of applications useful to the fishing industry was slower, carried out by trial and error, and conducted largely by using materials originally developed for other applications. In the New England trawl fishery, in spite of the recent trend toward increased use of synthetics, natural fibers still provide the bulk of the raw material for twine and webbing manufacture.

Synthetic twines were first introduced to the fishing industry shortly after the war by netting manufacturers who spun and twisted synthetic filament into conventional-type twines. These twines proved to be excellent trawl materials owing largely to their increased strength and longer life as compared with natural twines; but many trawl-fishermen felt that the added advantages were outweighed by the added capital expenditure required, and most webbing made from spun and twisted filament has been used by nontrawl segments of the industry--particularly by seine and gill-net fishermen. It has become apparent to trawl fishermen, however, that there were definite advantages to be gained from the use of synthetic twines, provided the initial cost of the twines could be reduced to compare more favorably with that of the natural-fiber twines currently in use.

DEVELOPMENT OF THE BRAIDED-TWINE INDUSTRY

Trawl fishermen soon found a partial answer to their quest for less expensive synthetics in the 3- to 4-fathom braided cords which could be obtained from surplus Armed Forces parachutes, air-drop cargo nets, and other devices. Application of these surplus synthetic braids to trawl construction was the beginning of a new approach to the manufacture of trawl twines and webbing. The braided material, although too thick for extensive use in nontrawl segments of the fishing industry, was ideal for construction of New England-type trawls. It, however, could not be handled by conventional net-making machinery. Net sections had to be made by hand and were primarily limited to cod-end sections by the size of braid available. New and better, but equally inexpensive, sources for braided synthetics were needed.

Waste material from tire, upholstery, fabric, thread, and firehose manufacturers was tried next. This waste material was hand-braided into a number of sizes of twine suitable for all sections of typical New England trawls, but little attention was paid to blending the yarns or to the uniformity of the final braid and the resulting product did not prove to be as practical as that obtained from Government surplus. Greater selectivity in waste buying and blending was necessary.

Emphasis was then placed on the use of conventional net-making machinery to replace hand labor. This increased the necessity for obtaining a relatively unvaried

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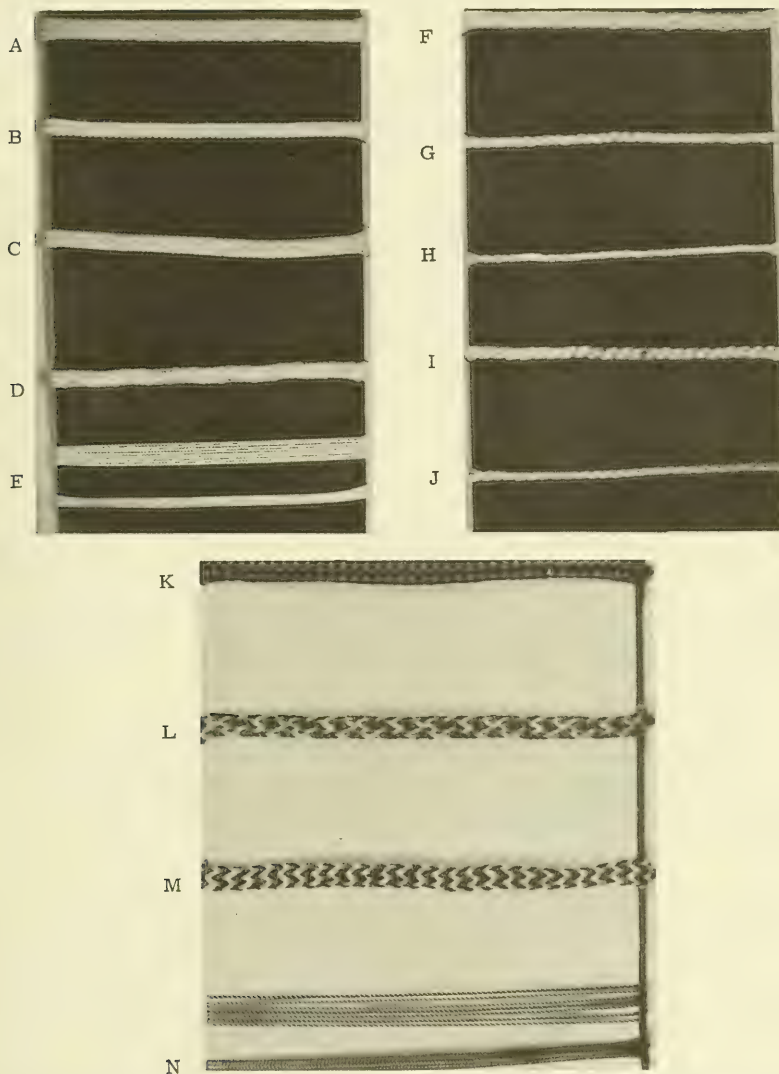


Fig. 1 - Synthetic braids and twines in common use aboard trawlers of the New England Fleet: (A) Westerbeke's No. 2 heavy nylon braid; (B) Lambeth Rope Company heavy nylon braid; (C) Westerbeke's No. 1 medium nylon braid; (D) Levine Marine Supply heavy nylon braid; (E) Armed Forces surplus Para-cord No. 550; (F) Levine Marine Supply Heavy nylon-Dacron braid; (G) Grimsby's heavy Terylene twisted twine; (H) Grimsby's light Terylene twisted twine; (I) Linen Thread Company No. 200/3 twisted nylon twine; (J) Linen Thread Company No. 400/3 twisted nylon twine; (K) Armed Forces surplus cargo netting No. 1,000 nylon braid; (L) Levine Marine Supply heavy Dacron-nylon braid; (M) Levine Marine Supply heavy braid; (N) Armed Forces surplus "Para-cord" No. 400 nylon braid.

source of waste supply for the manufacture of uniform braid. A suitable waste supply was found to be available from the tire-cord industry. Tire-cord manufacturers use high-quality synthetics; their specifications are rigid; and lot samplings are performed routinely to determine adherence to standards for several important qualities. An abundant supply of cord, rejected for tire manufacture, but suitable for twine manufacture is one result of the strict adherence to rigid specifications designed to maintain tire quality.

PRESENT CONDITION OF THE BRAIDED-TWINE INDUSTRY

At the present time, braided netting suppliers: (a) purchase waste tire cord; (b) braid the cord and knit it into webbing by machine; (c) cut the webbing into trawl sections. The only exception to that procedure occurs with heavy braids for cod ends. These are still knit by hand.

Compared with spinning, braiding is a simple operation, and the cost of braids made from manufacturing waste is far below the cost of twisted twine made from original synthetic filament. In many cases the cost of the finished braid produced by the braid suppliers is less than the cost of the original raw filament used by the tire-cord manufacturers.

CONSTRUCTION

Two general methods of manufacture are employed by the twine industry--braiding and spinning.

Braiding consists of weaving the assembled fibers, known as yarn or strands, so that they are crossed and recrossed and each strand passes alternately over and under the others. The tightness of the braid is determined by the number of picks per inch¹ and by the tension placed on the strands. Full utilization of the strength of the fibers is not realized with braided twine, but the method combines economy with the added strength of synthetic materials so that the finished product provides a stronger twine than was available using natural-fiber twines of equivalent weight at a cost that approaches that of the natural fibers.

Spinning consists of drawing out a ribbon of parallel fibers and twisting this ribbon into a cylinder. The fibers become tightly compressed against one another during this process and the resulting friction between the fibers holds them in place when the structure is pulled under tension. Compactness is determined by the degree of twist. The structure resulting from this process, being cylindrical, possesses maximum attainable strength for the amount and kind of fiber used.

CHARACTERISTICS OF BRAIDED TWINES

Differences in construction result in differences in physical characteristics of the braided twine, and these determine the behavior of the twines in use, the degree of mesh contraction, and the wearing ability of the twines. The type of fiber, amount of twist in the plys or strands, and the compactness of the twine (picks per inch) can have wide variation and can result in different characteristics in the final product. The construction details of a commonly-used Armed Forces surplus braided twine and a braided twine manufactured specifically for the trawl fishery from tire-cord waste (fig. 2) are given in table 1.

The Armed Forces surplus braided cord chosen for comparison was originally designed for cargo netting, to be used in dropping supplies by parachute. It is made up of filaments plied together with a very low twist. These are then plaited together in a loose fashion to form a very flexible braid capable of high-shock absorptive

¹Picks per inch: A textile term used in describing compactness or fineness of cloth or cord. Defined as the number of times a specific strand enters the braid in a measured inch of that braid.

ability, high elastic recovery, and great strength. Cod ends made from this material have a longer useful life than those made from any of the other twines obtained.

The braid, being flexible, and the component filaments being so formed and positioned that they are almost parallel to one another, causes the outer filaments to curl when broken, thereby protecting the inner filaments from further damage. Breaking of the outer filaments does not weaken the braid below a useful level because of the excessive initial strength of the braid material.

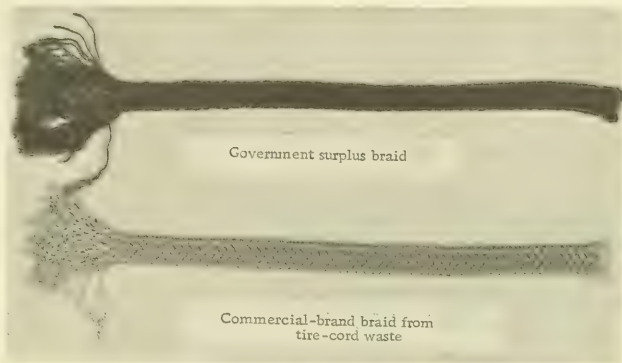


Fig. 2 - Representative braided nylon twines described in table 1.

Because of the looseness of the braid ("low number of picks per inch"), the surplus air-cargo netting braid often becomes infiltrated with sand and dirt. This often causes the braid to swell to a maximum of twice the original diameter thereby contributing greatly to a decrease in mesh size in those sections where the braid is subjected to the greatest wear and exposure to substrate (table 2 and fig. 3).

Construction Characteristic	Surplus No. 1,000 Cargo Cord	Commercial-Brand Cord Manufactured from Tire-Cord Waste
Yards/pound	43.83	38.89
Ends	96	48
Ends/carrier	6	3
Carriers	16	16
Denier/filament/ply	220/84/4	840/140/3
TPI Z-twist in single ply	1.26	12.10
TPI S-twist in 4-ply	3.38	-
TPI S-twist in 2-ply	-	9.9
Picks/inch	8.08	9.0

Braids made from tire-cord waste are made from

yarns having a very high twist in both the filament plies and the yarns because of the extreme compactness required by tire manufacturers. The commercial braid made from tire waste and

chosen for comparison with the surplus air-drop cargo-netting braid, is tightly plaited (containing a high number of picks per inch) and is therefore more compact but less flexible than the surplus material. It more nearly resembles natural-fiber twine in those characters. This braid tends to maintain a relatively stable mesh size,

not being susceptible to the degree of swelling noted in surplus braid. In use, the commercial braid tested reacted in a manner similar to natural-fiber twine and had considerable stretch when subjected to heavy stress and wear.

Net No.	Construction Material	Avg. Original Mesh Size	No. Trips Made	Avg. Mesh Size After Use
1	Double Parachute Cord No. 550D	4.39 inches	19	4.31 inches
2	" " "	4.41 inches	15	4.31 inches
3	" " "	4.39 inches	15	4.32 inches
4	Nylon Cargo Net Cord No. 1,000	4.63 inches	27	4.23 inches
*5	" " "	4.32 inches	23	3.61 inches
*6	" " "	4.39 inches	17	3.28 inches
*7	" " "	4.38 inches	20	3.90 inches
8	" " "	4.50 inches	25	4.01 inches
*9	" " "	4.26 inches	40	3.84 inches
*10	" " "	4.45 inches	28	3.60 inches

¹Figures used were obtained from certification records and after-use data gathered during 1954-58.

*Net still in use at time of measurement.

After-use measurements of two cod ends were made for comparative purposes. One cod end was constructed of Government surplus cargo netting. The other was made of a commonly-used commercial tire-cord waste braid. The results (fig. 3)

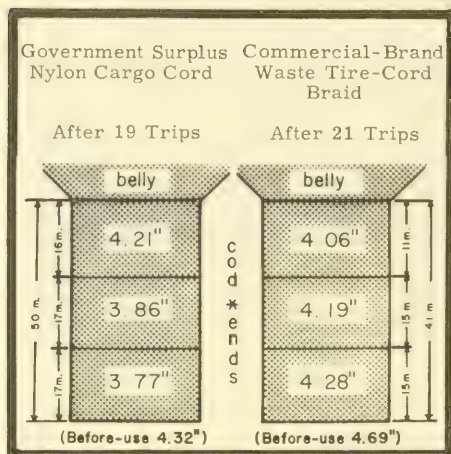


Fig. 3 - After-use measurements of two cod ends constructed of the materials described in table 1. Figures in mesh sections show internal mesh sizes after use. Figures below sections (before-use figures) refer to entire cod-end. Note that the area of maximum contraction varies with the construction material. (m = meshes)

which: (a) has the lowest initial cost; (b) has the longest useful life; (c) has the lowest maintenance costs; and (d) catches the most fish--is the most effective device for capture.

Initial Cost: The initial cost of a section of synthetic trawl webbing is still higher than that of an equivalent-size section of natural-fiber webbing, but the costs are more nearly equal now than in the past.

Useful Life: The useful life of synthetic webbing is many times longer than the useful life of natural-fiber webbing largely owing to the susceptibility of the natural-fibers to bacterial-induced rot. This longer life could contribute to a substantial saving in gear bills.

Maintenance Costs: Maintenance of synthetic fibers is simpler and usually cheaper than maintenance of natural-fibers and consists mainly of preventing overlong exposure to sunlight. The need to dry the nets frequently is done away with when using synthetics.

There is also less need for extensive repair when using synthetics as they are more resistant to the force of heavy catches and the blows and snagging effects often encountered in everyday operation.

Effectiveness: The effectiveness of synthetic-fiber gear compared with natural-fiber gear has been the subject of considerable debate. In the gill-net fishery many cases of increased effectiveness have been cited for synthetic nets. Less supporting evidence is available for trawl gear, but it must be assumed that synthetic trawls are, at the very least, as effective as natural fiber trawls.

ADVANTAGE OF SYNTHETIC TWINES IN THE NEW ENGLAND TRAWL FISHERY

Synthetic fibers most commonly used in the New England trawl fishery are nylon, dacron, and rayon. Chief advantages of these fibers result from their ability to withstand the effects of micro-organism attack, their high tensile strength, and their low level of moisture absorption. The synthetic fibers lose a greater amount of strength through knotting than do natural fibers, but even with this loss, their strength generally remains above the unknotted strength of natural fibers.

The most efficient gear is one which: (a) has the lowest initial cost; (b) has the longest useful life; (c) has the lowest maintenance costs; and (d) catches the most fish--is the most effective device for capture.

USE OF BRAIDED TWINES AND WEBBING IN THE NEW ENGLAND TRAWL-FISHING INDUSTRY

Synthetic twines and braids are still used on only a restricted scale in the New England trawl fishery owing to the hazards involved in the trawling operation. In "hard-bottom" fishing for cod and haddock, the bottom sections of the trawls are often subjected to "tear-ups" that may carry away whole sections of webbing--synthetic or natural-fiber--making a complete trawl of synthetic webbing somewhat impractical. Top wings, squares (overhangs), and cod ends are therefore often made of synthetic webbing, but natural-fiber webbing is used frequently for the more vulnerable parts of the net--the lower wings and bottom belly (table 3).

In the flounder fishery, conducted primarily on sand bottom, synthetic webbing is more suitable than natural-fiber webbing because it can withstand the effect of greater loads of sand without tearing up. "Sanding up" is a serious source of net loss with natural-fiber nets.

Table 3 - Fibers Used for Trawl Construction in the New England Fishing Fleet in 1958 (Based on a Survey Conducted in May 1958)			
Trawl Section	Number of Vessels Using		
	Manila Twine	Cotton Twine	Synthetic Twine
Cod ends	26	-	73
Squares	32	30	37
Top wings	29	30	40
Bottom wings	32	56	11
Top belly	32	44	23
Bottom belly	32	54	13

Experience has shown that it is often preferable to use cotton or manila for lacing and hanging nets to avoid the distortion of a section of webbing which otherwise often results following a hang-up. Use of manila- or cotton-lacing or hanging twine creates a weak point which carries away before serious damage is done to the webbing.

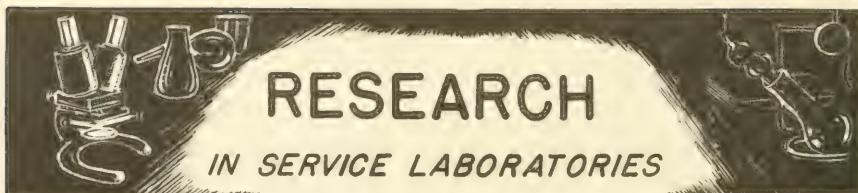
Trawls constructed wholly of 3/16-inch braided nylon cord were recently used in trawling over bottom considered too rough for natural-fiber nets in recent trial-trawling for red snapper in the Gulf of Mexico by the exploratory fishing vessel Silver Bay, under charter to the U. S. Bureau of Commercial Fisheries. Performance of the gear was considered satisfactory with only minor tear-ups recorded and with negligible loss of webbing.

Synthetic fibers will continue to be used in the New England trawling industry in the future, and, as their cost decreases, they will undoubtedly contribute to a greater and greater extent to the over-all efficiency of that fishery. Their place has been assured by industry acceptance of the results of practical application.



SILOS FOR FISH MEAL STORAGE

In Norway, it has been found that bulk storage of fish meal in grain silos is more practicable and cheaper than storage in bags. Distribution costs are also reduced. The meal should be stirred occasionally, which also ensures thorough mixing resulting in a meal of uniform quality. It seems preferable to divide the silos into smaller storage cells (Informationen über die Fischwirtschaft des Auslandes, June/July 1958).



DEVELOPING INSPECTION AIDS FOR SALMON AND HALIBUT

In the development of quality standards for fishery products, the U. S. Bureau of Commercial Fisheries' technological laboratories have recognized the need for selecting criteria which reflect actual differences in quality use of the product. Factors such as dehydration, packaging voids, size and number of pieces, trimming defects, and number of blemishes are easily described and tabulated in the standard or a supplementary manual for the inspectors.

In preparing inspection manuals for the frozen halibut steak standard and the proposed standard for frozen salmon steaks, the Seattle Technological Laboratory of the Bureau found that descriptions of defects relating to appearance, color, or shape were insufficient for orientation and guidance of inspectors. After considering possible use of models, sketches, and illustrative material, color photographs of steaks typifying these factors were selected for study and trial. Two sets of 5" x 7" color prints, numbering 10 prints in a set for each standard, were prepared to illustrate criteria for appearance, workmanship, discoloration, blemishes, and other visual factors considered in the standard. Frozen steaks demonstrating the various defects were selected by laboratory personnel; photographs were taken and the prints prepared by a professional photographer. The cost for each set of prints was a fraction of the cost estimate for preparation of wax or plastic models.

The use of color, proper lighting, and modern color-print techniques yielded a photographic print which reproduces visual factors and defects in a most realistic manner.

To date, experience in the laboratory and the use of the color photographs for demonstration purposes have indicated considerable value for their use as an inspection aid. Ease of use and portability are outstanding assets of the photographs in addition to their reasonable cost. Negatives are stored for future duplication when needed. The experience of both the film manufacturer and the photographer indicate good stability of the dye pigments used in the prints even if subjected to considerable sunlight during use.

It is believed that further studies over a longer period will enable the laboratory to select graded samples demonstrating defects at various score levels for photographic reproduction. Thus, for those factors in which visual identification and comparison are important, the laboratory can assist the inspector in uniform application of criteria through the help of modern photographic techniques.



DEVELOPMENT OF NEW STANDARDS FOR PACIFIC COAST FISH

Towards the end of 1959, the Seattle Technological Laboratory of the Bureau of Commercial Fisheries has completed the exacting work in the preparation of three new standards applicable to Pacific Coast fish. These standards are to be promulgated in the weeks to come and cover frozen salmon steaks, frozen cod fillets, and

frozen ocean perch fillets. The salmon steak standard includes all species of Pacific salmon and was developed after frequent consultation with the industry and a grading survey of 391 samples of commercially packaged salmon steaks.

Both the cod and ocean perch fillet standards were initiated by the Technological Laboratory, Gloucester, Mass. These preliminary drafts were revised after close cooperation with the Seattle laboratory to include the applicable Pacific Coast species. Interchange of personnel, samples, and laboratory data between the two laboratories in addition to consultation with industry in each area has assured the development of unified standards best suited to the needs of processors, distributors, and consumers.



BACTERIOLOGICAL STANDARDS FOR FROZEN FOODS UNDER STUDY

Bacteriological standards for frozen foods were discussed in an October 1959 meeting of officials and members of the industry organization--the National Association of Frozen Food Packers and representatives of the Association of Food and Drug Officials of the United States--primarily Federal and State officials connected with regulatory and control agencies.

A number of reports were presented on recent developments in bacteriological methodology and statistical treatment of bacteriological data. Four agencies, including the U. S. Bureau of Commercial Fisheries, reported on data obtained from bacteriological examination of plant-line samples of various frozen foods. There was a lengthy discussion following the papers, centering around such problems as: (1) Does the frozen food industry really need bacteriological standards? (2) What type of standard, that is, which of the various "indicator" organisms such as total plate count, coliforms, *E. coli*, enterococci, or staphylococci, best meet the requirements of a bacteriological standard? (3) What are fair and workable limits for each of these classes of microorganisms? And (4) what are the best test methods to recommend for each of these indicator organisms?

It is not surprising, considering the controversial nature of the subjects under discussion, that no definite decision was reached regarding the use of bacteriological standards for frozen foods. It was recommended that more data be collected by all the interested groups and that another meeting be held to further consider the problems involved.



FISH OILS HAVE UNIQUE FATTY ACID COMPOSITION

Research on the fatty acid composition of fish oils has not been carried far enough by chemists of the U. S. Bureau of Commercial Fisheries to give more than a very general idea as to species variation. Actually most fish have a reasonably similar composition with respect to fatty acid distribution such that the following information on fatty acid distribution of "fish in general" probably applies to most species. Whereas there is probably a relatively small difference in composition of fatty acids in fish from one species to another (a difference the Bureau has only begun to investigate), there is a huge difference in fatty acid composition of fish oils as contrasted to that of oils from vegetable or animal sources.

Most fish oils contain 20- to 30-percent saturated and 70- to 80-percent unsaturated fatty acids. At first consideration this may appear to be less unsaturation than in common vegetable oils (e.g., corn oil, which contains 85-percent un-

saturated vs. 15-percent saturated fatty acids). The place where fish oils are outstanding is in the large proportion of highly unsaturated fatty acids. Thus about half of the 70 to 80 percent of the unsaturated fatty acids of fish oils contain 3, 4, 5, or 6 double bonds, whereas corn oil contains only 1 and 2 double-bonded fatty acids. Usually 20 percent or more of the total fatty acids of a fish oil have 5 or 6 double bonds.

Since it is the total unsaturation (which is proportional to the number of double bonds present) which governs the cholesterol depressant effect of an oil, the fish oils have a much higher potential action in this respect than do the vegetable oils.

As has been indicated, there are enough results on variation in composition of fatty acids in different species of fish to give a good appraisal of the different species. Species of herring, mackerel, salmon, menhaden, mullet, sardines, anchovies, and tuna generally contain between 5 and 25 percent oil in the meat with a high variability from sample to sample even of the same species. Probably the degree of unsaturation of the variety of sardine canned from California pilchard is the greatest, but it is not known if it is sufficiently higher than that of the others to make any material difference. Most tuna oils are also highly unsaturated, but canned tuna usually contains added vegetable oil which more than compensates for any advantage that tuna oil otherwise might offer. Of the different species of salmon, pink salmon--one of the least expensive varieties--has a high degree of unsaturated fatty acids.

Most of the common species of fish have relatively low oil content in the range of 0.5 percent to 5 percent. Such species as cod, haddock, halibut, flounder, sole, and ocean perch, as well as the various shellfish are in this category. Such species are valuable in making up diets high in protein and low in oil. What oil does come from the fish is highly unsaturated, though the amount may be so small as to have little or no significant cholesterol-depressant effect.

Bureau research to learn the fatty acid composition of different species of fish is in its early stages. In the next few years it is expected that information will be available to provide more complete answers on the fatty acid composition of many varieties of fish.



NEW PRODUCTS FROM FISH OILS

During 1959, research has been carried out at the Seattle Technological Laboratory of the U. S. Bureau of Commercial Fisheries on the development of new products from fish oils along with investigations relative to determining the different quantities of the component fatty acids found in commercial fish oils. Major attention was given to two products, namely, monoglycerides and acetoglycerides. Gas-liquid chromatography was the principal technique investigated with respect to fatty acid composition.

MONOGLYCERIDES AND ACETOGLYCERIDES FROM FISH OILS: Monoglycerides and acetoglycerides are prepared from animal fats and vegetable oils and are used in such commercial products as shortenings, emulsifiers, and plasticizers. Such compounds prepared from fish oils may have unique properties in themselves such that they may prove to be valuable in similar commercial products.

Experimentally, it was shown that fish-oil monoglycerides could be easily prepared by a chemical reaction involving the triglyceride oil, glycerine, and a catalyst. An investigation was made to determine the optimum reaction time for the conditions of the process in order to give a high yield of the product, and at the same time to minimize the possible destruction of the high degree of unsaturation present in the original oil.

Acetoglycerides were prepared from the monoglycerides. Results gave little evidence for loss of unsaturation due to the conditions of the reaction. The acetoglycerides were found to be much more amenable to purification by distillation than were the monoglycerides. The acetoglycerides were very light in color and substantially free of odor. This was also true for the monoglycerides.

PURIFICATION OF FISH OILS: The principal objections to the commercial use of fish oils by most industries are that "fishy" odors are often imparted to the final product, such as in paints and soaps, and that the products are often unstable and are easily oxidized. The latter is a result of the chemical make-up and reactivity of fish oils.

An investigation was carried out on the applications of liquid-liquid extraction and molecular distillation of menhaden oil in an effort to produce an oil that possesses improved qualities. Results showed that menhaden oil could be greatly improved from the standpoint of odor and color. Work is continuing to determine the stability of the refined oil.

FATTY ACID COMPOSITION BY GAS-LIQUID CHROMATOGRAPHY: Gas-liquid chromatography is a method of analysis, which involves the vaporization of mixture components in a liquid-partitioning column, and chromatographing or separating the components of the mixture by carrying them through the column in an atmosphere of an inert gas, such as helium. The column is packed with solid particles supporting a nonvolatile partitioning liquid. Separation is accomplished on the basis of differences in partition coefficients for each separate component.

As a result of recent advances in gas-liquid chromatography, a tool is now available for the first time for the complete separation and quantitative analyses of the constituent fatty acids in fish oils. Work during the past year has included the adaptation of certain published techniques to the analyses of major commercial fish oils. The major part of this work was devoted to determining the most satisfactory conditions for the operation of our chromatographic equipment, in order to resolve the some 35 or more individual component acids. This work is continuing.



REFRIGERATED SEA WATER LENGTHENS STORAGE LIFE OF WHITING

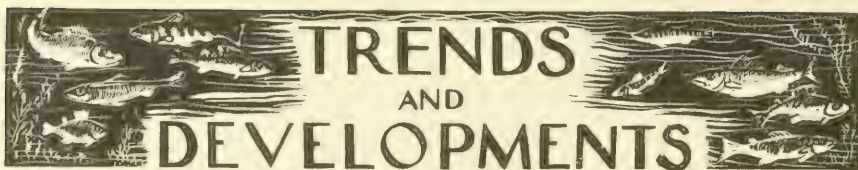
Whiting kept in refrigerated sea water have a much longer storage life than when kept in ice, according to tests made by the Gloucester Technology Laboratory of the U. S. Bureau of Commercial Fisheries. The meat of the whiting, although pleasant tasting, is soft-textured and is apt to lose its fresh quality rapidly even when stored in ice. This change is a serious matter to the processing plant whenever it is necessary to hold large quantities of the fish prior to processing.

Because refrigerated sea water has proved successful as a medium for holding other species of fish on the Pacific coast, the Laboratory studied the suitability of this method for holding whiting.

The tests revealed that whiting held in sea water at 30° F. was kept fresh longer than when stored in ice. An expert taste panel declared that 30° F. sea water kept whiting at a high quality level about twice as long as the same fish iced.

This improvement in the handling of a low-cost, abundant species is important to both industry and the consumer.





TRENDS AND DEVELOPMENTS

American Samoa

American Samoa Tuna Landings, 1958-59

Species	December		Jan.-Dec.	
	1959	1958	1959	1958
	(1,000 Lbs.)			
Albacore	2,655	2,452	22,474	22,251
Yellowfin	238	613	4,017	5,537
Big-eyed	63	53	982	1,060
Skipjack	1	-	15	-
Total	2,957	3,118	27,488	28,848

Note: Most of these tuna were landed by Japanese vessels; a small amount by South Korean vessels.



Byproducts

U. S. FISH MEAL, OIL, AND SOLUBLES PRODUCTION, 1959:

During 1959, fish meal and scrap production (based on information from

U. S. Production of Fish Meal, Oil, and Solubles, 1958-59

Product	Unit	1959 Preliminary	1958 Revised
		(Quantity)	
Meal and Scrap:			
Herring:			
Alaska	Tons	8,440	6,888
Maine	"	2,946	3,389
Menhaden	"	222,009	158,074
Sardine, Pacific	"	3,170	10,756
Tuna and mackerel	"	20,806	25,311
Unclassified	"	18,025	22,516
Total	"	275,396	226,934
Oil, Body:			
Herring:			
Alaska	Gallons	1,717,784	1,553,346
Maine	"	233,433	207,094
Menhaden	"	20,504,635	17,064,818
Sardine, Pacific	"	222,803	740,806
Tuna and mackerel	"	564,018	627,171
Other (including whale)	"	1,175,786	1,783,988
Total	"	24,418,459	21,977,223
Fish solubles	Gallons	29,894,692	20,980,221
Homogenized-condensed fish	Pounds	57,238,000	50,552,000

Note: Preliminary data based on information from firms which accounted for 91 percent of the 1958 production. The total production of fish meal in 1958 amounted to 248,140 tons.

firms which accounted for 91 percent of the 1958 production) amounted to 275,000 short tons--a gain of 48,000 tons as compared with 1958. The marine-animal oil yield amounted to 24.4 million gallons--2.4 million gallons above 1958.

Imports of fish meal and scrap during 1959 totaled 133,000 tons--33,000 tons more than in 1958. A sharp increase of 82.8 percent in the imports of fish solubles also occurred from 1958 to 1959. Exports of fish and fish-liver oils totaled 144.5 million pounds during 1959--a gain of 50.5 million pounds as compared with 1958.

Note: See Commercial Fisheries Review, April 1959, p. 37.



California

AERIAL CENSUS OF COMMERCIAL ABALONE FISHING CONTINUED:

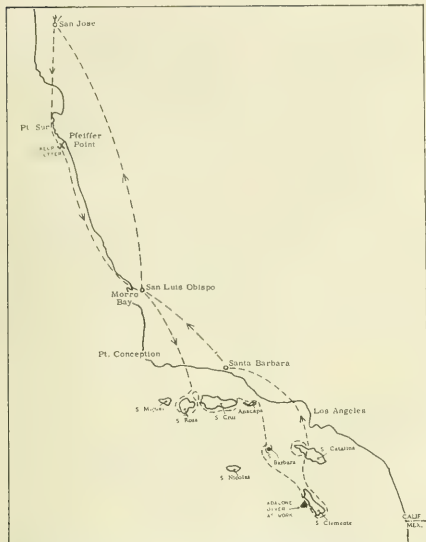
Airplane Spotting Flight 59-23-Abalone: The shoreline from Monterey to Morro Bay and the Channel Islands of Santa Rosa, Santa Cruz, Anacapa, Santa Catalina, Santa Barbara, and San Clemente was surveyed from the air on December 5, 1959, by the California Department of Fish and Game Twin Beechcraft to locate specific areas of commercial abalone diving.

Storm warnings had just been posted from Pt. Sur to the Mexican Border and gusts up to 70 m.p.h. in the Oxnard-Ventura region were reported.

From Monterey south to Morro Bay no diving boats were observed. A kelp cutter was operating below Pt. Sur in the cove at Piffers Point and several schools of unidentified fish were seen south of Pt. Sur.

Clearance from the military could not be obtained to fly over San Miguel Island but it was certain that no diving activity was in progress there because of the rough weather.

Among the Channel Islands, one diver was seen operating at San Clemente.



Airplane Spotting Flight 59-23-Abalone (December 5, 1959).

A kelp cutter was operating at Santa Barbara Island. Kelp growth along the mainland and among the islands had increased considerably since the flight on September 1959.

Note: Also see *Commercial Fisheries Review*, January 1960, p. 28, and February 1960, p. 29.

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PELAGIC FISH POPULATION SURVEY OFF COAST OF CENTRAL CALIFORNIA CONTINUED:

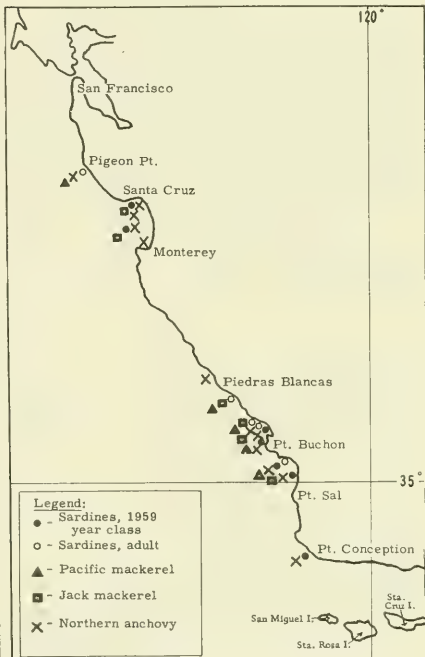
M/V "Alaska" Cruise 59A9-Pelagic Fish: The coastal waters off central California from Point Reyes to Santa Barbara were surveyed (October 21-November 9, 1959) by the California Department of Fish and Game research vessel *Alaska* to sample young sardines for determining relative abundance and distribution resulting from 1959 spawning. Other objectives were to sample adult sardines, Pacific mackerel, jack mackerel, and anchovies; to transport live fish to San Francisco for behavior studies being conducted by the California Academy of Sciences; to collect live sardines for genetic studies conducted by the U. S. Bureau of Commercial Fisheries laboratory at La Jolla; and to collect specimens as requested by other investigations.

A total of 79 light stations was occupied. Sardines were collected at 11, anchovies at 12, jack mackerel at 6, and Pacific mackerel at 5.

A total of 390 miles was scouted between stations. Only 11 schools were sighted, all unidenti-

fied. Although not densely schooled, large numbers of Pacific saury and atherinid "smelt" were observed between most stations from Point Reyes to San Simeon Bay. South of San Simeon Bay, "smelt" and California bonito were seen in moderate numbers.

Unfavorable winds were encountered during the first half of the trip, but the weather from October 31 until the completion of the cruise was ideal. The almost total absence of wind and rough seas made it possible to achieve thorough coverage of the area from San Francisco to Point Conception.



M/V Alaska Cruise 59A9-Pelagic Fish (October 21-November 9, 1959).

Adult sardines (180-235 mm.) were sampled at 5 stations from Pigeon Point to San Luis Obispo Bay and young sardines (68-137 mm.) were taken at 7 stations from Santa Cruz Harbor to just north of Point Conception.

Airplane Spotting Flight 59-21-Pelagic Fish: The inshore area from the Mexican border to Piedras Blancas Point was surveyed from the air (November 16-17, 1959) by the Department's Cessna 180 (3632C) to determine the distribution and abundance of pelagic fish schools.

Although weather and visibility conditions were fair to good, only 20 anchovy schools were seen.

Sixteen thin schools were found close to shore between the Standard Oil dock at Morro Bay and Oro Flaco Lake. The remaining 4 schools were off southern California, 2 small ones at the end of the Huntington Beach pier and 2 large ones, accompanied by many birds and two gray whales, one mile south of Pt. Dume.

In addition, a large school of porpoises was seen between Point Dume and Point Mugu.

Note: Also see Commercial Fisheries Review, Feb. 1960, p. 27.

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ROCKFISH STUDIED OFF SOUTHERN CALIFORNIA COAST:

M/V "Nautilus" Cruise 59N5-Rockfish: The area around Anacapa Island, east end of Santa Cruz Island, Santa Barbara Island and off Isthmus Cove, Santa Catalina Island, was surveyed by the California Department of Fish and Game's research vessel Nautilus to obtain vermillion rockfish (*Sebastes miniatus*), one of the most important market species in southern California, for life history studies, and to obtain other rockfish species.



M/V Nautilus Cruise 59N5-Rockfish (November 9-18, 1959).

Good weather during the entire cruise permitted a maximum of fishing time.

Although several baskets of set-line gear were available, most fishing was done with rod and reel. Many areas had to be tested before desirable species were encountered. On one occasion, a basket of set-line gear with 100 baited hooks was set in 85 fathoms off Anacapa Island, but the catch was poor considering the time spent in setting and retrieving the gear.

Depths from 16 to 108 fathoms were fished. A fair abundance of small- and medium-sized vermillion rockfish was found in approximately 32 fathoms off the north side of Santa Barbara Island. Both immature and mature fish were taken making it possible to determine the size at which they first mature. In addition, scales and otoliths were saved from each specimen for age determination, and sets of ovaries were preserved for fecundity studies.

In all, 15 species of rockfish were taken. The most important, aside from the vermillion rockfish, were bocaccio (*S. paucispinis*) and whitebelly rockfish (*S. vexillaris*).

Ocean whitefish (*Caulolatilus princeps*), up to 22 inches long, were frequently taken in nearly all the areas fished.

There appeared to be vast quantities of pelagic red crabs, *Pleuroncodes planipes*, in the areas fished off southern California. Most of the fish had been feeding heavily on them. In many cases, tiny kelp scallops, *Chlamys latiaurata*, were attached to these pelagic red crabs.



Canned Fish

UNITED STATES PACK, 1958-59:

The United States pack of fish and shellfish for human consumption declined in 1959 as a result of sharply re-

United States Pack of Certain Canned Fish Products, 1959 and 1958				
Product	1959 ¹		1958	
	Standard Cases	Pounds	Standard Cases	Pounds
Tuna:				
California	10,700,000	-	11,001,422	-
Washington and Oregon	1,280,000	283,006,000	1,227,071	277,130,641
Other	2,415,000		1,865,608	
Total	14,395,000	283,006,000	14,094,101	277,130,641
Salmon:				
Alaska	1,770,800	84,998,400	2,971,297	142,622,256
Pacific Coast States	692,400	33,235,200	760,663	36,511,824
Total	2,463,200	118,233,600	3,731,960	179,134,080
Sardines:				
Maine	1,750,000	40,950,000	2,099,959	49,139,041
Pacific	755,000	33,975,000	2,222,586	100,016,370
Mackerel, Jack and Pacific	595,000	26,775,000	404,425	18,199,125
Anchovies	3,000	93,750	53,735	1,679,219
Shrimp, South Atlantic and Gulf	745,000	11,175,000	808,314	12,124,710
¹ Preliminary.				
Note: Standard cases represent: tuna - 48 No. 1/2 tuna cans (solid pack 7 oz., chunks 6 1/2 oz., flakes and grated 6 oz. net); salmon - 48 1-lb. cans (16 oz. net); Maine sardines - 100 1/2 -oil cans (3 1/2 oz. net); Pacific sardines - 48 1-lb. cans (15 oz. net); mackerel - 48 1-lb. cans (15 oz. net); anchovies - 100 cans (5 oz. net); shrimp - 48 cans (5 oz. net).				

duced packs of salmon, Maine and Pacific sardines, anchovies, and Gulf shrimp. The pack of canned tuna (14,395,000 standard cases) established a new record.

Data were available on January 11, 1960, for items which accounted for 87 percent of the 1958 pack canned for human consumption. The case pack of these items in 1959 was down 13 percent, while the net weight of the pack was down 20 percent.



Cans--Shipments for Fishery Products, January-November 1959

Total shipments of metal cans for fishery products during January-November 1959 amounted to 109,026 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 117,322 tons in the same period of 1958. Shipments of metal cans declined 13.3 percent from October to November 1959 and were down by 17.7 percent from November 1958 to November 1959.



As of the end of November, the canning of Maine sardines and Pacific salmon was about over for the 1959 season and packs were below normal. The California sardine pack at end of November 1959 was running about 65 percent under the 1958 pack. The lighter packs of those canned fish items were partially responsible for the drop in the shipments of metal cans from January-November 1959 as compared with the same period in 1958.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.



Central Pacific Fisheries Investigations

TILAPIA CULTURE AS SOURCE OF LIVE BAIT FOR TUNA FISHERY SUCCESSFUL:

As an important part of a program to supplement the short supply of natural tuna bait (nehu, principally), the Honolulu Biological Laboratory of the U. S. Bureau of Commercial Fisheries completed in December 1959 the two-year operation of a tilapia-rearing plant on Maui Island. This plant represented a cooperative venture in which the Laboratory operated the plant, a commercial fishing firm constructed the plant, and the Hawaiian Board of Agriculture and Forestry provided policing, fencing, and other services in connection with the project. The operation of this plant has served two objectives: (1) to determine the economic feasibility of rearing tilapia as a live-bait species for skipjack tuna fishing; and (2) to supply a source of bait for sea tests of this species.

Tests of the effectiveness of tilapia as live bait were made during both years aboard some of the skipjack vessels. In 1958 the average catch using tilapia was 46 pounds of skipjack per pound of tilapia used, while in 1959 the catch of skipjack was an average of 92 pounds per pound of tilapia. The comparable catch of skipjack, using nehu, was 50 pounds of skipjack per pound of nehu in 1958 and 57 pounds per pound of nehu in 1959. Undoubtedly some of the higher returns per pound of bait expended in 1959 should be attributed to the fact that, individually, the "season" fish available to the fishermen during 1959 were substantially larger than was true of the fish available during the same period in 1958. However, the relatively higher catch per pound of tilapia bait as compared to that obtained with nehu indicates that with increased familiarity with the behavior of tilapia and with some modifications of fishing techniques, tilapia bait was employed with much greater efficiency in 1959 than in 1958 for catching skipjack.

The operation of the plant during 1959 was improved through the utilization of other experiments conducted at the Kewalo Basin Laboratory on optimum sex

ratios and fish densities for a maximum rate of reproduction. In addition, the water in the brood tanks at Maui was aerated and, for one tank, heated during the winter and spring months of the year.

The total production of tilapia during 1959 exceeded that for 1958 by approximately 300,000 fry (1,293,457 as compared with 1,074,076). These production figures averaged 1,078 fry per female in 1959 and 724 fry per female in 1958.

While undoubtedly a lower concentration of fish, heating, and aeration contributed to the higher production in 1959 as compared to that of 1958, the spring of 1959 was a warm, sunny one while that of 1958 was wet and cloudy with somewhat lower than normal temperatures. Additionally, a higher grade of feed for the fish was used in 1959 as compared to that used in 1958.



Crabs

MARYLAND SAMPLES WINTER BLUE CRAB POPULATION FOR CLUES TO FUTURE HARVESTS:

To help unravel the mystery of the widely fluctuating blue crab harvest in Maryland, a team of biologists from that State's Chesapeake Biological Laboratory surveyed upper Chesapeake Bay waters late in January 1960.

The Laboratory's research vessel *Cobia* dredged for hibernating crabs between the Patuxent River and the Bay Bridge, as one phase of a long-range effort to predict crab harvests and possibly protect future crab populations.

The vessel's dredging runs crisscrossed the Bay in a sampling pattern designed to discover if crabs have highly specialized preferences regarding hibernating quarters. The area was sampled systematically in order to see if an adequate population-sampling technique could be devised. It is already known by scientists that all the crabs that will be caught in Chesapeake Bay in a given summer are also present during the preceding winter; there is no significant outside source.

The blue crabs in winter are practically motionless; their activity almost ceases when water cools to 41° F., and the bottom temperature is about 40° F. late in January.

Most of the hibernating crabs, as shown by preliminary runs on the Patuxent River, were either large ones (six inches or wider) which escaped last summer's harvest, or were the very small (from $\frac{1}{4}$ to $1\frac{1}{2}$ inches) which hatched last summer and which will enter the harvest for the first time late next summer as $3\frac{1}{2}$ -inch soft crabs.

Other points noted from the Patuxent River trials by the biologists (subject to further verification) are: (1) crabs apparently prefer to winter on bottoms of mud or oyster shells; and (2) most crabs taken with the dredge so far have been found in 10 to 20 feet of water. Practically none were found at or below 50 feet, although this depth is a common crab habitat in the lower Bay.

Maryland crabbers and packers will benefit considerably if harvests can be predicted even six months in advance. In the past, the harvest has been as low as 12 million pounds (in 1941) and as high as 32 million pounds (1950). Such fluctuations often leave the unsuspecting industry and market in grave difficulty.

The dredging program will also help in many other phases of crab research, including study of causes of good or poor crops, effect of harvesting on total numbers, and migration patterns. Many people feel that harvesting pressure controls the future supply, but there is some evidence that environmental factors are usually far more potent.

Maryland's crab research is conducted in cooperation with the Virginia Fisheries Laboratory, and fits into the broad program of necessary blue crab research established by the Atlantic States Marine Fisheries Commission.



Federal Purchases of

Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-DECEMBER 1959:

Fresh and Frozen Fishery Products:
For the use of the Armed Forces under

Canned Fishery Products: Tuna was the principal canned fishery product purchased for the use of the Armed Forces during December 1959. In 1959, purchases of canned tuna were down by 37.2 percent and canned salmon purchases were lower by 67.5 percent as compared with 1958. However, canned sardine pur-

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, December 1959 with Comparisons

QUANTITY				VALUE				AVERAGE PRICE	
December		Jan.-Dec.		December		Jan.-Dec.		Jan.-Dec.	
1959	1958	1959	1958	1959	1958	1959	1958	1959	1958
..... (1,000 Lbs.) .....				..... (\$1,000) .....				... (¢ Per Lb.) ...	
1,775	1,630	22,651	22,511	876	883	11,624	12,850	51.3	57.1

the Department of Defense, 1.8 million pounds (value \$876,000) of fresh and frozen fishery products were purchased in December 1959 by the Military Subsistence Supply Agency. This exceeded the quantity purchased in November by 23.0 percent and was 8.9 percent above the amount purchased in December 1958. The value of the purchases in December 1959 was higher by 22.9 percent as compared with November, but 0.8 percent less than for December 1958.

During January-December 1959 purchases totaled 22.7 million pounds (valued at \$11.6 million)-increase of 0.6 percent in quantity, but down 9.5 percent in value as compared with 1958.

Prices paid for fresh and frozen fishery products by the Department of Defense in December 1959 averaged 49.4 cents a pound, unchanged from November, but 4.8 cents less than the 54.2 cents paid during December 1958. The average price of 51.3 cents paid for all purchases of fresh and frozen fishery products in 1959 was down sharply from the 1958 average of 57.1 cents a pound. This was due mainly to lower prices for nearly all fishery products in 1959.

chases in 1959 increased 315 percent from 1958.

Note: Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated because local purchases are not obtainable.



Fisheries Loan Fund

FISHERIES LOANS APPROVED OCTOBER 1-DECEMBER 31, 1959:

As of December 31, 1959, a total of 664 applications for fisheries loans totaling \$21,060,664 had been received since the loan fund program was started. Of these, 355 (\$8,356,095) had been approved, 230 (\$6,741,309) had been declined or found ineligible, 53 (\$2,314,156) have been withdrawn, and 26 (\$2,626,133) are pending. Several of the pending cases had been deferred indefinitely at the request of the applicants. Sufficient funds are available to process new applications when received.

The following loans had been approved between October 1 and December 31, 1959:

New England Area: Alexander Smith, New Bedford, Mass., \$18,800.

South Atlantic and Gulf Area: John M. Snedeker, St. Petersburg, Fla., \$5,000; Roderick M. McCall, Jr., McIntosh, Ga., \$2,900; Warren H. Rector, Awendash, S.C., \$20,000; and Barney Lee Sanders, Aransas Pass, Tex., \$19,000.

Table 2 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, December 1959 with Comparisons

Product	QUANTITY				VALUE			
	December 1959	1958	Jan.-Dec. 1959	1958	December 1959	1958	Jan.-Dec. 1959	1958
	..... (1,000 Lbs.) .....				..... (\$1,000)			
Tuna	741	918	3,698	5,884	315	486	1,672	1/
Salmon	-	-	1,085	3,336	-	-	737	1/
Sardine	25	142	1,051	253	11	19	177	1/
Totals	766	1,060	5,834	9,473	326	505	2,586	1/

1/Unavailable.

California: Ernest & Elvera Montiero, San Diego, \$64,000; John D. & Warren K. Simpson, San Diego, \$3,550; and August W. Angellsen, San Pedro, \$3,260.

Pacific Northwest (All Washington): Delbert B. O'Hara, Bellingham, \$2,100; Robert Myette, Bellingham, \$7,522; James W. McCormick, Olympia, \$3,000; Gunnar Abelsen, Port Angeles, \$3,000; John V. Linvog, Seattle, \$10,000; and John Preece, Seattle, \$5,100.

Alaska: Norton B. Sorrels, Juneau, \$3,000; Erick W. Lindeman, Ketchikan, \$14,000; and Adolph M. Nelson, Ketchikan, \$10,000.



Hawaii

HIGHER SKIPJACK TUNA LANDINGS IN 1959 BEAR OUT PREDICTION BY BIOLOGISTS:

On the basis of early 1959 variations in selected oceanographic conditions in Hawaiian waters, a prediction was made by biologists of the U. S. Bureau of Commercial Fisheries during the month of March 1959 that the 1959 total landings of Hawaiian skipjack would be average or better than average. With inclusion of incomplete December 1959 statistics, the partial landings for 1959 totaled 11,429,350 pounds. Total average annual landings for the years 1948 to 1958 were 9,800,000 pounds. During only two years, 1951 with 12,900,000 pounds and 1954 with 14,000,000 pounds, did the landings at Honolulu exceed those for 1959.

The higher-than-average 1959 catches were made by a reduced fleet. Twenty sampans were in operation as compared to 28 for 1951 and 27 for 1954.

The Hawaiian skipjack tuna fishery is seasonal, with the bulk of the annual

catch being taken between May and September. Normally, a large percentage of the skipjack caught during those months weigh 18-22 pounds, with small fish 4-8 pounds and large fish 28-32 pounds. The off-season (November to April) catches average 4-8 pounds per fish. During the 1959 season, the 24-31 pound group dominated the catch as compared with the expected 18-22 pound fish. During December 1959, a month well into the off-season, the dominant group in the catch continued to be larger fish, 20-22 pounds, as compared with the anticipated 4-8 pound skipjack.



Maine Sardines

CANNED STOCKS, JANUARY 1, 1960:

Distributors' stocks of Maine sardines totaled 235,000 actual cases on January 1, 1960--33,000 cases or 12.0 percent less than the 268,000 cases on hand January 1, 1959. Stocks held by distributors on November 1, 1959, amounted to 296,000 cases, and on July 1, 1959, totaled 176,000 cases, according to estimates made by the U. S. Bureau of the Census.

Canners' stocks on January 1, 1960, totaled 843,000 standard cases (100 $3\frac{1}{2}$ -oz. cans), a decrease of 48,000 cases (5.0 percent) as compared with January 1, 1959. Stocks held by canners on November 1, 1959, amounted to 1,001,000 standard cases.

The 1959 pack (from the season which opened on April 15, 1959, and ended on December 1, 1959) was about 1,751,000 standard cases as compared with 2,100,000 cases packed in the 1958 season. The pack for the 1957 season totaled 2,117,151 standard cases.

The total supply (pack plus carryover on April 15, 1959) at the canners' level as of January 1, 1960, amounted to

Table 1 - Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, January 1, 1960, with Comparisons

Type	Unit	1959/60 Season		1957/58 Season				
		1/1/60	11/1/59	7/1/59	6/1/59	4/1/59	1/1/59	11/1/58
Distributors	1,000 Actual Cases	235	296	176	197	254	268	312
Canners	1,000 Std. Cases ²	843	1,001	422	272	474	891	1,037

¹ Table represents marketing season from November 1-October 31.

² 100 $3\frac{1}{2}$ -oz. cans equal one standard case.

2,171,000 standard cases, or 10.8 percent below the total supply of 2,434,000 cases as of January 1, 1959. Cannery shipments from April 15, 1959, to January 1, 1960, amounted to 1,328,000 cases as compared to 1,543,000 cases for the same period a year earlier.

On January 1, 1960, a total of 52,000 cases of canned Maine sardines were in the hands of retail multiunit organizations--22.1 percent of the stocks in distributors' hands.



Marine Conservation

SEA LIFE CONSERVATION PROGRAM DISCUSSED AT WILDLIFE CONFERENCE:

The sea has been aptly called an unknown jungle but great potentials exist for the control, cultivation, and concentration of the harvest thereof, the Director of the U. S. Bureau of Commercial Fisheries told the Northeast Wildlife Conference January 11, 1960. The conference met in Providence, R. I.

After touching briefly on the history of commercial fisheries in this country and reviewing some of the current operations and results of recent research, the speaker plunged into the problems and possibilities of practicing conservation in the oceans. The principal concepts of the talk were:

New concepts in conservation are developing in the world's marine laboratories with increasing emphasis on the "weather" of the sea, the possibility of creating artificial "upwellings," the "farming" of bays and estuaries, the development of brackish water areas for fish culture, and the challenge of the nations of the world, one to another, for the fruits of the "rich ocean pastures."

Marine scientists are recognizing that the important fisheries are not the only things which exist beneath the surface of the ocean. These fish live in complex communities and compete and struggle for their niche in their marine environment just as do land plants and animals. Studies of the environmental factors affecting the life and death of these marine communities seem to be essential for future conservation of the marine fisheries. Ocean "weather," that is, the conditions which exist below the surface, is a variable which affects the habits and life of all ocean fisheries. Conservationists must understand thoroughly the ocean environment and the various anomalies which affect the fishes living there.

Vertical currents of water, called "upwellings" which occur naturally in the vicinity of the equator, bring up minerals and nutrients from the ocean depths to the surface and provide the basis for the start of the food chain for ocean life. Even now some oceanographers are considering the possibility of heating deep areas in the open ocean, or even heating localized areas, and creating artificial upwellings which would transfer the nutrients and minerals from the depths to the surface.

International fisheries and the accompanying problems are increasing in importance. As nations turn to the sea for food and recreation, there is bound to occur the question of ownership of the resources, the problem of which nations shall share in the resources, and how the sharing can be done. Not only have nations like Russia and Japan established huge fishing fleets which seek out and harvest rich crops from the sea, but they are also developing large and efficient oceanographic research vessels. This is a challenge which the United States

must meet to insure food and recreation for our citizens in the future.

Relative to the farming of bays and estuaries, the United States has a problem of its own to solve. In Asia and in some of the countries of southern Europe where conditions are favorable, this type of fish culture is rather well developed. The possibilities of intensive sea farming similar to that practiced on land is, therefore, not an impractical concept. But in this country, the demand for estuarial areas for industrial purposes or for subdivisions, or for some other purpose, is already threatening this area of conservation. This definite trend can not be stopped by negative action but facts are not at hand for affirmative action. Therefore we need to get on the job on an emergency basis for developing the facts which, in turn, will be the basis for a sound conservation program in those areas.

Much has been learned and much must still be learned on the biology of fish, upon making intelligent harvests, and the economic and physical sciences involved if the nations of the world are to make the sea produce even a portion of its great potential.

The speaker also reviewed the work of many of the international commissions which now exist and showed their conservation successes in spite of what scientists concede to be only a fraction of the knowledge which man should have in formulating a conservation program for the various oceans.



New England

LANDINGS OF FOOD FISH LOWER, INDUSTRIAL FISH HIGHER IN 1959:

The principal New England fishing ports in 1959 produced less food fish but more industrial fish than the previous year, according to a preliminary report from the U. S. Bureau of Commercial Fisheries' Market News office at Boston, Mass. Total food-fish landings were 466 million pounds, 5 percent less than in 1958, while industrial-fish landings totaled 228 million pounds, 6 percent more than the previous year. The total ex-vessel value of \$42 million for all 1959 landings was about the same as the previous year.

Landings at Boston, Gloucester, New Bedford, Provincetown, Woods Hole, Mass., Portland, Rockland, Me., Point Judith, R. I., and Stonington, Conn., represent about 75 percent of all New England landings.

The New England fishing fleets operated at capacity in 1959 and landed about 33,400 trips of all types as compared with 32,600 trips the previous year. Good relations between fishermen and vessel owners continued in 1959. Some vessels improved their physical condition with funds

obtained through the Bureau's Fishery Loan Fund program.

Gloucester was the leading food-fish producer in 1959 with 154 million pounds. Next was Boston with 111 million, New Bedford 70 million, Portland 56 million, Rockland 42 million, Provincetown 15 million, Point Judith 11 million, Woods Hole 4 million, and Stonington 3 million pounds.

Gloucester also had the largest drop in landings of food fish from the previous year--14 million pounds. Boston followed with a decrease of 13 million pounds.

Ocean perch continued as the leading food species landed at New England ports in 1959, as 136 million pounds were brought to the docks, 12 million pounds less than in previous years. Gloucester landings in 1959 of ocean perch were 18 million pounds less than in 1958, while Portland and Rockland, Me., had heavier landings.

Haddock landings totaled 96 million pounds in 1959 and was the next leading food species. This was also under the 1958 total by 7 million pounds. Boston, the leading haddock producer with 70 percent of the total, handled 13 million pounds less than in 1958.

Next in volume was whiting with a total of 82 million pounds, 75 percent of which was landed at Gloucester. The 1958 total was also 82 million pounds at all ports.

Total landings of the other important food species at the New England ports in 1959 were: flounders 50 million pounds, cod 30 million, and pollock 21 million pounds. Pollock landings were down 7 million pounds while cod and flounder landings in 1959 were close to the 1958 total.

Sea scallops, the most valuable of the New England ocean food species, set a new record volume in 1959. A total of 20 million pounds was landed, 90 percent of this at New Bedford, the Nation's leading scallop port.

The industrial-fish fleets at New England's ports produced 228 million pounds of fish for use in animal food and fish meal in 1959. This was 13 million pounds more than in 1958 due to more plentiful supplies of menhaden in North Atlantic waters. Poor conditions in the fish-meal market in 1959 precluded an even greater increase. Some fish-meal plants shut down before the end of the year due to the heavy inventories and poor market for meal destined for poultry feed. Point Judith continued as the leading industrial-fish producer with a total of 91 million pounds; trailing were Gloucester with 75 million, and New Bedford with 38 million pounds.

Stocks of frozen New England-produced fishery products were in very good supply in warehouses throughout the Nation as 1959 ended. Domestic production was augmented by imported products that continued to arrive at a record pace. As a result of the heavier inventories, wholesale prices of the major New England-produced fishery products in 1959 were lower than in the preceding years.

The fish-stick and fish-portion industry continued at a good pace in 1959. Although these products were made almost exclusively from foreign-produced blocks of groundfish fillets, the industry did provide full employment at many processing plants, and provided business to many related industries. The fish-portion production increased considerably as this item is becoming very popular in the institutional market. In 1959 the U.S. Customs Court ruled that imported fish



blocks were dutiable at a lower rate than heretofore, giving an additional advantage to foreign fish block producers.

Replacement of fishing vessels continues to be one of New England's most serious problems. New construction was almost negligible as vessel operation has not always been profitable in recent years, due to ever-increasing costs of operation. Some New England fishing vessels were sold to Canadian interests in 1959. Federal aid in the form of a construction subsidy was sought. Both houses of the 1959 Congress passed bills to provide this aid, but adjournment came before a Conference committee could be appointed to work out a compromise. It is hoped by the industry that 1960 will see Federal legislation in this form to aid the New England groundfish industry reach a more favorable economic position to meet foreign competition.



Oysters

VIRGINIA BIOLOGISTS DISCOVER CAUSE OF OYSTER MORTALITIES IN CHESAPEAKE BAY:

Scientists at the Virginia Fisheries Laboratory, Gloucester Point, have found a micro-organism not known before in oysters from Virginia waters. This organism, possibly a member of a group of parasitic one-celled animals called Sporozoans, was discovered in Delaware Bay less than two years ago by a scientist of Rutgers University. It is believed to be the primary cause of extensive losses of oysters in Delaware Bay since 1957. It poses no public health problems.

During 10 years of oyster-mortality studies, biologists at Virginia's marine laboratory have refined the tray method of observation on natural beds and collected what is probably the most detailed and longest set of records on mortalities of oysters in existence. This backlog of information has proven invaluable in evaluating unusual oyster losses. One important cause of mortalities, the fungus Dermocystidium, has been studied fairly thoroughly; however, other agents have received inadequate attention until recently.

A more intensive surveillance of Virginia waters was begun in 1959 following the Delaware catastrophe of 1957 and 1958. Trays were established in most major oyster-producing areas early in 1959 and were examined frequently throughout the year to detect mortalities of oysters.

During 1959, two Laboratory biologists collected and examined thousands of oysters in a search for causes of mortalities. Approximately 4,000 oysters were examined individually for the well-known and long-established fungus-killer of oysters--Dermocystidium. Eight hundred of these have been used to prepare stained slides for microscopic search for other parasitic organisms. The new organism was found in these slides and its similarity to the Delaware Bay "Sporozoan" has been confirmed by the Rutgers University biologist.

The new unnamed organism has been found widely distributed in lower Chesapeake Bay--York River, Mobjack Bay, Chesapeake Bay proper, and both the bay and ocean sides of the Eastern Shore of Virginia. Examination of oysters preserved in earlier years is underway to determine how long the new organism has been in Virginia waters. It is possible that it has been in Chesapeake Bay for many years and will not cause serious trouble.

An unexplained spring loss was followed by heavy late summer and fall losses in lower Chesapeake Bay in 1959, but it appears most of the warm season losses were caused by the old oyster nemesis--Dermocystidium. The new organism has been found on the oceanside of the Eastern Shore where Dermocystidium is absent but no losses have occurred there since July 1959.

Although the new organism seems to have played a minor role in deaths of oysters in 1959, its reported importance in Delaware Bay provides a vivid warning of what could happen in Chesapeake Bay. James River oysters shipped by the Laboratory of New Jersey and planted in Delaware Bay in June 1959 were 60 percent dead by December 1959.

Oystermen have been advised to keep a close watch on their beds through the year beginning at the end of winter and particularly in spring.

Scientists at the Laboratory state that oysters stopped dying at the end of October--as usual--and that no public health problems are involved either with the new organism or with Dermocystidium.



Shrimp

CALIFORNIA'S LANDINGS HIGHER IN 1959:

The 1959 California ocean shrimp landings totaled 1,777,874 pounds, an increase of 47,652 pounds over the 1958 record of 1,730,222 pounds, the California Department of Fish and Game reported on January 22, 1960. The 1959 record was made possible by increasing quotas in the Crescent City and Fort Bragg area, the Department's Director explained.

Area A (California-Oregon State line to Cape Mendocino) led all others with California landings of 1,317,972 pounds, plus about 400,000 pounds landed in Oregon. The 1958 California landings were 1.1 million pounds.

The average catch per fishing hour in Area A was 638 pounds for the entire season as compared with 501 pounds in 1958.

The Area A fleet operated out of Crescent City the entire season, chiefly off the Klamath River and Redding Rock, working a 20-mile stretch in depths ranging from 52 to 90 fathoms and averaging 65 fathoms.

Other area catches: Area B-1 (Cape Mendocino to Pt. Arena) a record 444,998 pounds was landed during the 1959 season as compared with 329,714 pounds in 1958. Rough weather and strong currents cut down the catch per fishing hour from 656 pounds in May to 464 pounds in June and to 222 pounds in July.

Area B-2 (Pt. Arena to Pigeon Point) failed to yield shrimp in 1959.

Area C (Pigeon Point to Pt. Conception) produced 14,904 pounds as compared with 87,949 pounds in the 1958 season.

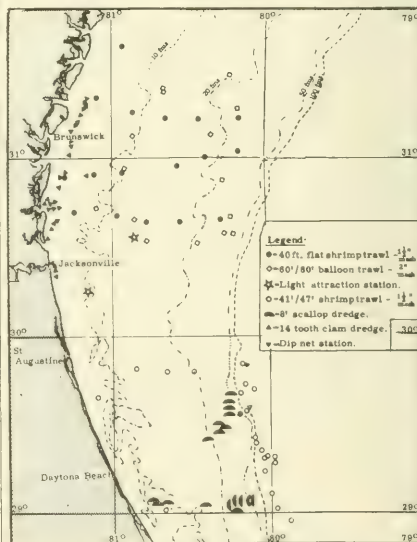


South Atlantic Exploratory

Fishery Program

COMMERCIAL BEDS OF SCALLOPS FOUND OFF FLORIDA EAST COAST:

M/V "Silver Bay" Cruise 21: Catches of commercial-size scallops by the U. S. Bureau of Commercial Fisheries charted fishing vessel Silver Bay in 20 to 30 fathoms east of Cape Canaveral, Fla., indicate an extensive area with good possibilities for commercial-scale fishing. The January 13-29, 1960, cruise was the fourth in a series designed to explore the inshore and offshore areas along the South Atlantic Coast between North Carolina and Florida.



M/V Silver Bay Cruise 21 (Jan. 13-29, 1960).

A total of 18 tows was made with an 8-foot scallop dredge, with activities partially handicapped by heavy seas at the time. Considerable variation was evidenced in both the abundance and size of scallops taken. Catches as high as 7-10 bushels of mixed shells and live scallops were taken per 15-minute tow. The ratio of shells to live scallops was about five to one by weight. Generally, a single size group of medium-size scallops ($1\frac{1}{2}$ -2 inches) were taken in the 10-15 fathom depth range, while two size groups, very small and large ($2\frac{1}{2}$ -3 inches) marketable-size scallops, were taken in the 20-30 fathom depth range.

Other objectives of the cruise were to: (1) determine catch-rate data for species of fish suitable for use as pet food or for reduction out to the 25-fathom curve between Brunswick, Ga., and Daytona Beach, Fla.; (2) explorations for hard clams (*Mercenaria* species) along the 3-5 fathom depth range between Altamaha Sound, Ga., and the St. John's River, Fla.; and (3) to recheck royal-red shrimp fishing grounds previously located in the Florida stream along the 200-fathom depth curve between 29 and 30 degrees N. lat.

Exploratory Fishing for Industrial Fish: A total of 39 tows along east-west transects was made with a 40-foot, two-seam, balloon trawl; and a 40-foot flat trawl fished on a 25-fathom bridle with a single towing warp and six-foot chain doors; and an 80-foot, two-seam balloon trawl fished with two warps and eight-foot bracket doors. Catches up to 225 pounds per 1-hour tow of large (7-13 inch) vermillion snapper (*Rhomboplites aurorubens*) were made over typical snapper-type bottom in the vicinity of $30^{\circ}39'$ N. lat. and $80^{\circ}17'$ W. long. Only small catches of industrial fish were taken in the area fished with trawl nets.

Exploratory Fishing for Hard Clams: Thirty sets were made with a 14-tooth Fall River clam dredge. Sets were concentrated near inlets, and where possible on mud bottom. Typically, hard sand bottom was encountered and only 3 live clams were taken.

Test Fishing for Royal-Red Shrimp:

A total of 16 3-hour tows was made with a 40-foot, two-seam balloon trawl to obtain samples of royal-red shrimp for biological studies. Small numbers of royal-red shrimp were taken in the 175-225 fathom depth range. Gear fouling and depth recorder difficulties caused some loss of fishing time and poor depth control.



Tuna

TAGGED BLUEFIN TUNA CROSS ATLANTIC:

For the past several years, personnel from the Woods Hole Oceanographic Institution have accompanied the U. S. Bureau of Commercial Fisheries' exploratory fishing vessel *Delaware* on various offshore tuna explorations in order to tag bluefin tuna and other pelagic species captured during long-line operations. As a result of these cooperative efforts, a bluefin tuna tagged from the *Delaware* on May 24, 1959, 325 miles east of Ocean City, Md., was caught during tuna-seining operations in the late summer of 1959, near Provincetown, Mass. The tag was recovered during canning operations.

In addition, the Woods Hole Oceanographic Institution reports 2 bluefin tuna tagged near No Man's Land, Mass., in July 1954, were captured during the summer of 1959 in the Bay of Biscay. According to French authorities, probably 8 more bluefin tagged by personnel of the Woods Hole Oceanographic Institution have been caught by French fishermen who failed to save the tags.



United States Fishing Fleet^{1/} Additions

OCTOBER 1959:

A total of 34 vessels of 5 net tons and over were issued first documents as fishing craft during October 1959--a decrease of 21 vessels as compared with the same

^{1/}Includes both commercial and sport fishing craft.

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft by Areas, October 1959

Area	October		Jan.-Oct.		Total
	1959	1958	1959	1958	
	(Number)				
New England	1	-	14	11	13
Middle Atlantic	1	1	11	12	13
Chesapeake	18	18	87	57	99
South Atlantic	2	12	71	122	135
Gulf	8	16	125	247	270
Pacific	4	7	88	103	112
Great Lakes	-	-	6	6	10
Alaska	-	-	31	31	31
Virgin Islands	-	-	-	1	1
Total	34	55	433	620	684

Note: Vessels assigned to the various areas on the basis of their home ports.

month of 1958. The Chesapeake area led with 18 vessels while the Gulf area was second with 8 vessels, and the Pacific was third with 4 vessels.

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft by Tonnage, October 1959

Net Tons	Number
5 to 9	22
10 to 19	5
20 to 29	4
30 to 39	1
40 to 49	2
Total	34

craft--187 less than in the same period of 1958. The number of vessels issued first documents in the Gulf area dropped 122 below the number reported for the first ten months of 1958.

NOVEMBER 1959:

Thirty-two vessels of 5 net tons and over were issued first documents as fishing craft during November 1959--4 less than in November 1958. The Chesapeake led all other areas with 13 vessels, followed by the Pacific with 7 vessels, the Gulf with 6 vessels, and the South Atlantic with 3.

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft by Areas, November 1959

Area	November		Jan.-Nov.		Total
	1959	1958	1959	1958	
	(Number)				
New England	1	1	15	12	13
Middle Atlantic	1	1	12	13	13
Chesapeake	13	6	100	93	99
South Atlantic	3	9	74	131	135
Gulf	6	12	131	259	270
Pacific	7	4	95	107	112
Great Lakes	-	3	6	9	10
Alaska	1	-	32	31	31
Virgin Islands	-	-	-	1	1
Total	32	36	465	656	684

Note: Vessels assigned to the various areas on the basis of their home ports.

A total of 465 vessels were issued first documents as fishing craft during the first eleven months of 1959--191 less than during the same period of 1958.

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft by Tonnage, November 1959

Net Tons	Number
5 to 9	21
10 to 19	3
20 to 29	4
30 to 39	1
50 to 59	1
80 to 89	1
110 to 119	1
Total	32

DECEMBER 1959:

A total of 14 vessels of 5 net tons and over were issued first documents as fishing craft in December 1959--a decline of 14 vessels as compared with the same

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft by Areas, December 1959

Area	December		Total			
	1959	1958	1959	1958	1957	1956
	(Number)					
New England	-	1	15	13	19	15
Middle Atlantic	-	-	12	13	23	26
Chesapeake	6	6	106	99	104	138
South Atlantic	2	4	76	135	130	119
Gulf	4	11	135	270	166	100
Pacific	2	5	97	112	102	76
Great Lakes	-	1	6	10	8	6
Alaska	-	-	32	31	48	40
Hawaii	-	-	-	-	-	1
Puerto Rico	-	-	-	-	1	-
Virgin Islands	-	-	-	1	-	-
Total	14	28	479	654	601	521

Note: Vessels assigned to the various areas on the basis of their home ports.

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft by Tonnage, December 1959

Net Tons	Number
5 to 9	7
10 to 19	4
20 to 29	2
50 to 59	1
Total	14

Table 3 - U. S. Vessels Issued First Documents as Fishing Craft, 1938 to 1959

Year	Number
1959	479
1958	684
1957	601
1956	521
1955	418
1954	717
1953	729
1952	675
1951	780
1950	812
1949	1,002
1948	1,184
1947	1,300
1946	1,085
1945	741
1944	635
1943	358
1942	358
1941	354
1940	320
1939	357
1938	376

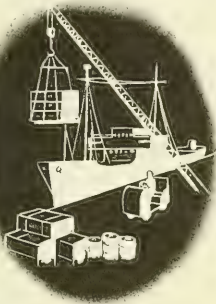
month of 1958. The major portion of the decline occurred in the Gulf area where only 4 vessels were issued first documents as compared with 11 in December 1958.

Year 1959: A total of 479 vessels were issued first documents as fishing craft during 1959--a decrease of 205 vessels (30 percent) as compared with 1958.

U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, NOVEMBER 1959:

Imports of edible fresh, frozen, and processed fish and shellfish into the United States during November 1959 decreased by 23.0 percent in quantity and 11.4 percent in value as compared with October 1959. The decrease was due primarily to lower imports of groundfish and other fillets (down 14.2 million pounds), frozen tuna other than albacore (down 10.6 million pounds), and frozen shrimp (down 5.0 million pounds). The decrease was partly offset by a 1.3-million-pound increase in the imports of lobster and spiny lobster, frozen albacore tuna (up 1.4 million pounds), and fresh and frozen salmon (up 2.4 million pounds).



U. S. Imports of Edible Fishery Products, November 1959 with Comparisons						
Item	Quantity			Value		
	Nov. 1959	Nov. 1958	Nov. 1958	Nov. 1959	Nov. 1958	Nov. 1958
	(Millions of Lbs.)			(Millions of \$)		
Imports:						
Fish & shellfish:						
Fresh, frozen, & processed/ . . .	86.9	80.1	1956.8	26.5	22.7	278.4
Exports:						
Fish and shellfish:						
Processed only/ (excluding fresh & frozen)	9.6	5.8	41.2	4.5	1.8	15.6
/ Includes pastes, sauces, clam chowder and juice, and other specialties.						

Compared with November 1958, the imports in November 1959 were up by 8.4 percent in quantity and 22.7 percent in value due to higher imports of frozen albacore tuna (up 1.1 million pounds), groundfish fillets (up 5.3 million pounds), canned tuna in brine (up 4.7 million pounds), and canned salmon (up 2.6 million pounds). Compensating, in part, for the increases was a drop of about 5.3 million pounds in the imports of tuna other than albacore and 1.7 million pounds in fresh and frozen salmon.

United States exports of processed fish and shellfish in November 1959 were higher by 52.7 percent in quantity and 136.8 percent in value as compared with October 1959. Compared with the same month in 1958, the exports this November were higher by 64.6 percent in quantity and 150.0 percent in value.

GROUNDFISH FILLET IMPORTS:

December 1959: Imports of cod, haddock, hake, pollock, cusk, and ocean perch, classified as fillets, during December 1959, totaled 3.2 million pounds. Canada was the leading country with 2.0 million pounds or 61 percent of December's total imports. Seven other countries supplied the remaining 39 percent.

The sharp decline since August 1959 in the imports of groundfish fillets was due to a United States Customs Court ruling which held that fish fillet blocks imported in bulk (15 pounds and over) are dutiable at one cent per pound under Tariff paragraph 720 (b) rather than 1½ cents per pound under Tariff paragraph 717 (b). This ruling became effective on September 15, 1959. Thus data on imports of groundfish fillets since that date are not comparable with previous figures.

Year 1959: Preliminary data indicate that United States 1959 imports of groundfish (including ocean perch) fillets and blocks into the United States totaled 144.9 million pounds as compared with 155.9

Table 1 - United States Imports of Groundfish (Including Ocean Perch) Fillets and Blocks, 1958-59

Country of Origin	1959	1958/
	(1,000 Lbs.)	(1,000 Lbs.)
Canada	75,128	103,013
Miquelon and St. Pierre	1,456	709
Greenland	938	189
Iceland	37,826	30,356
Norway	11,619	6,201
Denmark	14,195	9,779
United Kingdom	408	237
Ireland	3	-
Netherlands	632	552
France	-	91
West Germany	2,693	3,977
Union of South Africa	-	66
Japan	12	763
Total	2/144,910	3/155,933

1/Revised.

2/Does not include about 40.0 million pounds of blocks of fillets, bits and pieces received under Tariff paragraph 720 (b).

3/Does not include about 9.6 million pounds of blocks of bits and pieces received under Tariff paragraph 720 (b).

million pounds in 1958. An additional 40.0 million pounds of fillets, bits, and pieces were imported in 1959 and 9.6 million pounds in 1958 under Tariff paragraph 720 (b). This means imports of groundfish fillets under all categories totaled 184.9 million pounds in 1959 as compared with 165.5 million pounds in 1958.

Imports of groundfish classified as blocks of fillets in bulk (15 pounds and over), and bits and pieces are not included in table 1. The quota of groundfish and ocean perch fillets and blocks permitted to enter the United States at 1½ cents a pound in the calendar year 1959 was 36,919,874 pounds, based on a quarterly quota of 9,229,968 pounds. The quota for the calendar year 1958 amount-

ed to 35,892,221 pounds. Imports during individual quarters in excess of the established quarterly quota enter at a duty of 2½ cents a pound.

Note: See Chart 7 in this issue.

* * * * *

UNITED STATES FISH OIL EXPORTS SET RECORD IN 1959:

United States exports of fish oils (including fish liver oils) reached a record 72,240 short tons in 1959, slightly exceeding the previous high in 1955. The upsurge in exports follows 2 years of sharply declining shipments, notably to Western Europe--the major market for United States fish oils.

Exports to Western Europe in 1959 were up 74 percent from 1958 and accounted for virtually all of the total exports. Shipments to Sweden in 1959 were over 6 times larger than in the previous year, reflecting the shortage of Norwegian marine oils. Exports to the Netherlands last year were more than double those of 1958; however, they were almost 50 percent below the record volume of 1955. Shipments to Canada dropped sharply in 1959 following a recovery of Canadian marine-oil production late in 1958 and continued high output throughout last year in that country.

U. S. Exports of Fish Oils (Including Liver Oils) by Country of Destination, Averages 1935-39 and 1950-54, Annual 1955-59

Country of Destination	1959 ¹	1958 ^{1/}	1957	1956	1955	Average	
						1950-54	1935-39
..... (Short Tons)							
North America:							
Canada	1,914	6,485	1,238	1,621	11,308	2,707	458
Cuba	57	99	129	112	84	113	155
Mexico	176	123	50	63	90	109	45
Other	146	12	9	37	3	26	71
Total	2,293	6,719	1,422	1,833	11,491	2,955	729
South America	6	26	42	62	56	84	96
Europe:							
Belgium-Luxembourg	2,167	2,344	661	759	1,098	215	8
Denmark	577	-	-	866	-	-	-
France	40	5	5	-	9	273	19
West Germany ^{2/}	16,588	17,118	26,296	32,491	10,503	12,913	126
Italy	10	119	178	60	106	71	15
Netherlands	23,058	10,920	14,978	25,023	39,642	18,260	15
Norway	8,054	5,794	5,272	6,251	6,758	1,444	10
Sweden	20,365	3,370	7,716	2,646	-	-	7
Switzerland	-	558	794	367	640	4,991	15
United Kingdom	5	-	854	920	881	335	77
Other	-	-	-	-	23	25	8
Total	69,854	40,228	56,754	69,383	59,665	38,530	300
Asia:							
Philippine Republic	-	-	7	10	-	585	66
Other	30	31	6	5	55	28	24
Total	30	31	13	15	55	613	90
Africa	-	17	305	24	68	25	19
Oceania	-	-	4	-	-	-	-
Grand Total	3/72,240	47,021	58,540	71,317	71,336	42,207	1,234

^{1/}Preliminary. ^{2/}Total Germany. ^{3/}Includes 67 tons whose destination is not indicated.

* * * * *

IMPORTS AND EXPORTS OF SELECTED FISHERY PRODUCTS, 1959:

Summary: During 1959, increased quantities of most fishery products were imported into the United States. Tuna again led all other fishery products in the quantity imported. Fish meal, groundfish and ocean perch fillets and blocks, shrimp, and other leading imports were also substantially higher than in 1958. Significant gains were reported for frozen tuna (except albacore), up 26 percent; canned tuna in brine, up 22 percent; frozen blocks of groundfish and ocean perch, up 22 percent; fish meal, up 33 percent; and shrimp, up 25 percent.

The quantities of leading U. S. fishery products exported were also generally higher than during 1958. As in past years, exports consisted primarily of fish oils and canned fish products. Exports of fish oils were up 54 percent from 1958 levels; canned salmon up 50 percent; canned sardines (not in oil), up 110 percent; and canned squid, up 63 percent.

Imports: Frozen tuna imports in 1959 were at a record high of 235,912,000 pounds. Japan supplied about 64 percent of that total. Additional quantities, however, were received in the United States by transshipment from Japanese tuna vessels operating in the Atlantic Ocean. Frozen tuna imports from Peru were nearly double those of 1958. A large increase also occurred in imports from Ecuador. Imports of frozen albacore were about the same as in 1958, but imports of other species of tuna rose 26 percent.

Tuna loins receipts increased during 1959. Japan supplied 4,731,000 pounds more in 1959 than in the previous year; total imports of 7,545,000 pounds were, however, less than

the 10,600,000 pounds imported during 1957. Self-imposed limits by the Japanese have governed the quantity shipped to the United States.

Canned tuna receipts rose 22 percent above the previous record level of 1958. Owing to favorable tariff provisions, nearly all canned tuna imported is packed in brine. A 12½-percent ad valorem duty was paid on canned tuna in brine which entered under the 1959 quota of 52,372,574 pounds; a 25-percent duty was paid on about 2,934,000 pounds received over the quota. Canned tuna in oil, dutiable at 35 percent, was imported only in small amounts.

Fresh and frozen groundfish and ocean perch fillet (exclusive of blocks) imports increased slightly despite lower receipts of ocean perch fillets. Imports of frozen fillet blocks and slabs rose 22 percent to a record high. Canada accounted for 58 percent of the fillets and 50 percent of the blocks; and Iceland, for 27 percent of the fillets and 19 percent of the blocks.

On July 15, 1959, the U. S. Customs Court of New York ruled that all fish blocks were dutiable under Paragraph 720(b) at one (1) cent per pound, if the blocks and container weighed in excess of 15 pounds. Previously, fish fillets pressed and frozen into blocks had been subject to the same duty as plain fillets.

During 1959, imports of groundfish and ocean perch fillets, including blocks classified and received under Tariff paragraph 717(b), totaled 144,900,000 pounds. These were dutiable at 1-7/8 and 2-1/2 cents a pound, depending upon the status within the tariff quota applying to this paragraph. An additional 40,000,000 pounds of fillets in blocks or slabs, dutiable at one cent a pound under Tariff paragraph 720(b), were imported.

Prior to the ruling, frozen blocks of fillets accounted for a considerable part of the fillet imports at the 1-7/8 or 2-1/2 cent rate under the tariff quota. Since blocks of fillets are now classifiable under a different tariff paragraph, the entire quota at the 1-7/8 cent rate under paragraph 717(b) will be filled by fillets (not fillet blocks). As a result, larger quantities of such fillets will be imported at the lower rate of 1-7/8 cents.

Although the United States is one of the leading producers of fish meal, large quantities have been imported to supply the U. S. market. Imports of 132,955 short tons in 1959 were the highest since 1954. The principal foreign suppliers were Peru, Canada, and Angola.

During the past two years, Peru has been the leading foreign supplier of fish meal to the U. S. market. The fish meal industry of Peru is based on the anchoveta fishery. During 1959, the estimated Peruvian fish-meal production of about 300,000 short tons was over four times greater than its production in 1957. This rapid rise in production has made a large impact on the world trade in fish meal. A sharp increase in the U. S. production of fish meal and solubles and heavy imports caused prices to drop sharply in the last quarter of 1959. Prices in other world markets were also lower.

Fish solubles imports nearly doubled during 1959 reaching 26,630 short tons. Denmark, with 18,723 short tons, was the leading supplier. Fish solubles are a concentrate made from the liquid residue left in the production of fish meal.

Shrimp (mostly frozen) imported in 1959 increased by 25 percent and exceeded 100,000,000 pounds (heads-off) for the first time. Although Mexico supplied 64 percent, or the major share of those imports, 51 countries shipped shrimp to the United States. Among countries from which shrimp entered the U. S. market for the first time in 1959, British Guiana sent 970,000 pounds and Iran sent 740,000 pounds.

Canned salmon imports of 31,155,000 pounds in 1959 were at a record high level. Japan supplied nearly 30,000,000 pounds and Canada the remainder.

Canned crab-meat imports rose by 13 percent in 1959. Japan supplied nearly the entire amount. Crab meat packed in the Soviet Union is still prohibited from entering the United States.

Table 1 - U. S. Imports of Selected Fishery Products, 1959
Compared with 1958

Commodity	1959	1958
..... (1,000 Lbs.)		
Groundfish and ocean perch:		
Fillets	99,544	95,442
Blocks or slabs 1/	85,290	70,089
Total	184,834	165,531
Fillets other than groundfish:		
Flounder	14,491	14,779
Fresh-water fish	15,930	14,568
Swordfish, mainly fillets	16,487	16,236
Other	20,971	19,550
Total	67,879	65,133
Tuna, fresh or frozen:		
Albacore	51,956	51,645
Other than albacore	183,956	146,313
Total	235,912	197,958
Tuna, canned in brine:		
Albacore	12,879	12,498
Other than albacore	42,428	32,948
Total	55,307	45,446
Tuna, canned in oil	830	756
Tuna, loins and discs	8,164	4,983
Bonito and yellowtail, canned ..	13,521	1,118
Crab meat, canned	7,306	5,854
Fish meal	265,910	200,704
Fish solubles	53,260	29,134
Lobster, fresh or frozen:		
Northern	20,635	21,413
Spiny	28,093	25,938
Lobster, canned	4,442	2,761
Oysters, mostly canned	5,953	5,379
Salmon:		
Fresh or frozen	19,700	26,180
Canned	31,155	29,226
Sardines:		
Canned in oil	21,152	18,001
Canned, not in oil	1,012	10,155
Sea scallops, fresh or frozen ..	5,110	3,903
Shrimp, mostly frozen, some canned and dried	106,555	85,394
Swordfish, fresh	5,572	4,106

1/ Mostly fillets but including some bits and pieces.

Sea scallops, fresh or frozen: Both Canada and Japan, which supply almost the entire amount, sent increased quantities of sea scallops in 1959. Imports were up 31 percent.

Canned sardine imports (not in oil) fell sharply in 1959. This followed the past pattern of trade in this product. Heavier U. S. landings of pilchards in 1958 enabled domestic producers to pack sardines under more favorable conditions. Shipments in 1959 from the Union of South Africa fell to 619,000 pounds from nearly 8,000,000 pounds in the previous year. Norway, Portugal, and Denmark, the three leading U. S. suppliers of canned sardines in oil, all sent increased quantities in 1959.

Exports: Despite strong competition from foreign products, U. S. exports of canned sardines, not in oil, were 37,454,000 pounds, or more than double those of 1958. The Philippine market with 67 percent took the major share of those exports.

The United Kingdom continued to be the major market for U. S. canned salmon, taking 70 percent of the U. S. exports. During 1959, the Philippines was the other large market, reportedly taking over 2,000,000 pounds.

During 1959, canned squid ranked third in quantity of U. S. fishery exports. The Philippines, consistently an important market for U. S. canned fish, imported 6,139,000 pounds. Mediterranean countries, primarily Greece, have also been good markets for U. S. canned squid.

Table 2 - U. S. Exports of Selected Fishery Products, 1959 Compared with 1958

Commodity	1959	1958
	... (1,000 Lbs.) ...	
Fish oils	144,481	94,043
Miscellaneous fish		
mostly fresh-water	6,378	18,361
Oysters, shucked	783	834
Salmon:		
Fresh or frozen	1,464	1,083
Canned	13,826	9,227
Mackerel, canned	742	2,308
Miscellaneous canned fish		
(mostly California anchovies)	373	1,199
Sardines:		
Canned, not in oil	37,454	17,816
Canned in oil	1,270	645
Shrimp:		
Mostly frozen	2,091	1,648
Canned	2,875	2,161
Squid, canned	9,110	5,583

During 1959, U. S. exports of fish oils reached a record high of 144,481,000 pounds. European countries imported over 95 percent of this product. Sweden increased its imports of U. S. fish oils by about 34,000,000 pounds. The 40,710,000 pounds taken during the year placed Sweden second only to the Netherlands, as the leading buyer of U. S. fish oils.

The upsurge in exports follows two years of declining shipments, notably to Western Europe. Shipments to Sweden in 1959 were unusually large (over six times those of 1958), primarily reflecting the shortage of Norwegian marine oils. Shipments to Norway also increased. Shipments to Canada dropped sharply in 1959 following a recovery of Canadian marine-oil production late in 1958 and continued high output in 1959.

By far the world's largest importer of shrimp products, the United States also exports considerable quantities of shrimp. During 1959, exports of fresh and frozen shrimp were 2,091,000 pounds, up 27 percent from the previous year and of canned shrimp 2,875,000 pounds, up 33 percent. Cured shrimp, primarily sun-dried, is also exported. Canada takes the major share of the U. S. exports of frozen and canned shrimp and a large part of the cured shrimp.

* * * * *

SHRIMP IMPORTS, 1959:

United States imports of all shrimp (fresh, frozen, canned, and dried) from all countries in 1959 amounted to 106.6 million pounds as compared with 85.4 million pounds for the same period in 1958. Shrimp imports from Mexico in

United States Shrimp Imports (Fresh, Frozen, Canned, and Dried), 1958-59		
Country of Origin	1959	1958
	... (1,000 Lbs.) ...	
Mexico by Customs Districts:		
Florida	490	138
New Orleans	3,270	2,871
Laredo	21,631	20,947
El Paso	110	29
San Diego	1,444	1,718
Arizona	41,674	30,334
Los Angeles	34	61
St. Lawrence	1	-
Total Mexico	68,654	56,098
British Honduras	83	4
Greenland	-	41
Canada	134	263
El Salvador	1,838	1,129
Guatemala	182	39
Honduras	271	836
Nicaragua	213	278
Costa Rica	1,156	717
Panama	8,805	7,917
Canal Zone	64	193
Bahamas	-	4
Cuba	229	391
Leeward & Windward Islands	13	-
Netherlands Antilles	46	-
Jamaica	48	-
Colombia	1,899	890
Venezuela	370	121
British Guiana	967	-
Surinam	288	82
Ecuador	4,712	4,438
Peru	279	487
Chile	327	163
Brazil	79	-
Argentina	946	606
Iceland	32	16
Sweden	13	21
Norway	160	144
Denmark	196	46
United Kingdom	62	2
Netherlands	2	1
Western Germany	82	86
Finland	1	-
Spain	192	230
Italy	185	267
Lebanon	5	-
Turkey	2	5
Iran	740	-
Israel	43	14
India	2,866	1,700
Pakistan	640	637
Singapore	1	-
Philippines	1	5
Vietnam	1	1
Thailand	52	-
Korea	198	128
Hong Kong	640	4,029
Taiwan	15	-
Japan	7,229	2,552
Australia	284	364
Egypt	1,310	450
Grand Total	106,555	85,393

1959 totaled 68.7 million pounds as compared with 56.1 million pounds in 1958.

Most of the imported shrimp is frozen except for some canned shrimp from northern Europe and Japan and some dried shrimp from Hong Kong and Japan.

The United States imported shrimp from 48 countries in 1959 as compared with 39 countries in 1958. Some notable increases occurred in the imports of frozen shrimp from El Salvador, Costa Rica, Mexico, Colombia, Argentina, India, Japan, Iran, and Egypt. On the other hand, imports from Hong Kong dropped from 4,069,000 pounds in 1958 to only 640,000 pounds in 1959.

Note: Also see *Commercial Fisheries Review*, April 1958, p. 55.



U. S. Production of Fish Sticks and Portions, 1959

The United States production of fish portions in 1959 amounted to 37.0 million pounds, while the production of fish sticks totaled 60.3 million pounds. This was an increase of 15.2 million pounds or 70 percent in fish portions, but a drop of 643,000 pounds or 1 percent in fish sticks as compared with 1958.

Month	Cooked	Uncooked	Total
	(1,000 Lbs.)		
January	5,717	548	6,265
February	5,784	556	6,340
March	5,132	462	5,594
April	4,342	366	4,708
May	4,084	314	4,398
June	4,284	291	4,575
July	3,477	306	3,783
August	3,560	312	3,872
September	4,752	591	5,343
October	5,434	395	5,829
November	4,496	324	4,820
December	4,406	327	4,733
Total Quantity 1959	55,468	4,792	60,260
Total Value 1959	(\$1,000)		
	27,062	1,889	28,951

^{1/}Preliminary data.

During 1959, 5.5 million pounds of breaded cooked and 29.0 million pounds of breaded raw portions were processed. Of the 1959 total production of portions, 93 percent was breaded raw and cooked

portions, and unbreaded portions (2.4 million pounds) accounted for the remaining 7 percent.

Month	1959 ^{1/}	1958	1957	1956	1955
	(1,000 Lbs.)				
January	6,265	5,471	4,261	4,862	5,345
February	6,340	5,925	5,246	5,323	5,794
March	5,594	5,526	5,147	6,082	7,205
April	4,708	4,855	4,492	3,771	5,953
May	4,398	4,229	3,380	3,873	4,879
June	4,575	4,702	3,522	3,580	5,392
July	3,783	4,574	3,821	3,153	4,340
August	3,872	4,358	4,643	4,166	4,520
September	5,343	5,328	4,861	4,085	4,535
October	5,829	5,485	5,162	5,063	5,261
November	4,820	5,091	4,579	4,585	4,946
December	4,733	5,359	4,014	4,019	4,876
Total	60,260	60,903	53,128	52,562	63,046

^{1/}Preliminary data.

Fish stick production in 1959 consisted of 55.5 million pounds of cooked fish sticks, or 92 percent of the total. The remaining 4.8 million pounds, or 8 percent, was made up of raw fish sticks.

Area	1959 ^{1/}	1958
	No. of Firms	No. of Firms
Atlantic Coast States	25	50,448
Land and Gulf States	6	5,408
Pacific Coast States	10	4,404
Total	41	60,260

^{1/}Preliminary data.

The Atlantic Coast States led all other areas in the production of fish portions and fish sticks with 19.8 and 50.4 million pounds, respectively.

Month	Breaded			Unbreaded	Total
	Cooked	Uncooked	Total		
	(1,000 Lbs.)				
January	577	1,959	2,536	156	2,692
February	571	2,329	2,900	125	3,025
March	529	2,315	2,844	381	3,225
April	399	2,018	2,417	217	2,634
May	228	2,199	2,427	257	2,684
June	323	2,694	3,017	230	3,247
July	216	1,884	2,100	127	2,227
August	287	2,333	2,620	176	2,796
September	592	2,783	3,375	183	3,558
October	535	3,551	4,086	165	4,251
November	490	2,759	3,249	172	3,421
December	763	2,220	2,983	217	3,200
Total					
Quantity 1959	5,510	29,044	34,554	2,406	36,960
Total	(\$1,000)				
Value 1959	2,517	9,529	12,046	1,030	13,076

^{1/}Preliminary data.

Table 5 - U. S. Production of Fish Portions, by Areas, 1958-1959				
Area	1959 ^{1/}		1958 ^{2/}	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States Inland, Gulf, and Pacific Coast States	25	19,793	19	12,047
Total	38	36,960	27	21,790

^{1/}Preliminary data.

^{2/}Revised.

Table 6 - U. S. Production of Fish Portions, by Months, 1958-1959		
Month	1959 ^{1/}	1958 ^{2/}
	.. (1,000 Lbs.) ..	
January	2,692	1,973
February	3,025	1,254
March	3,225	1,478
April	2,634	2,268
May	2,684	1,478
June	3,247	1,504
July	2,227	2,161
August	2,796	1,516
September	3,588	1,566
October	4,251	2,560
November	3,421	1,979
December	3,200	2,060
Total	36,960	21,790

^{1/}Preliminary data.

^{2/}Revised.



Washington

EXPERIMENTAL PLANTINGS OF EASTERN HARD CLAMS IN PUGET SOUND WATERS SUCCESSFUL:

Thousands of quahogs or hard clams (*Mya arenaria*) from Massachusetts are being planted on muddy beaches in Oyster Bay and other south Puget Sound areas by the Washington State Department of Fisheries in a mass clam-planting program. The mass plant is being made from a ton of hard clams. The shipment totaled between 15,000-16,000 cherry-stone clams from 2 to 3 inches in length.

"Small test plantings of quahogs conducted the past two years at Pt. Whitney and elsewhere have proved highly successful," said the State's Fisheries Director. He believes that this mass plant will become the foundation of adequate seed stocks for use on muddy ground and beaches, favored by the eastern hard clam, but not utilized by any of the Pacific Coast native hardshell clams.

"For the time being, we are asking that these clams not be dug, in order

to build up a good supply of seed stock," the Director stated.

Previous test plants of hard clams have proved successful, but this is the first large-scale transfer of the shellfish from the East Coast. It will not be the last. The plantings now under way will be followed by other mass plants in the San Juan Islands area on selected mud flat areas. It is also the beginning of a long-range, comprehensive program, instituted by the State's Fisheries Director, to fully utilize the State's oyster reserves and public clam beaches both commercially and for the enjoyment of the public for personal-use clam digging.

Fisheries Department personnel have begun a survey of public tidal areas to determine practical means of transplanting seed clams (both Pacific and Atlantic) from abundant areas to public clamming beaches and deep-water areas and for the distribution of native and cultured varieties of clam seed produced by laboratory rearing.

* * * * *

GOVERNOR CONCERNED OVER OUTCOME OF LAW OF THE SEA CONFERENCE:

The Governor of the State of Washington announced on January 22, 1960, that he was concerned over the outcome of the forthcoming International Law of the Sea Conference scheduled to open on March 27, 1960, at Geneva, Switzerland.

He stated that the State of Washington stands to lose a good deal more under Canada's 12-mile territorial sea proposal than people realize.

"After conferring with the Director of Fisheries and others of the sport and commercial fishing industry, it appears the State's all-out effort to build up the salmon runs returning to Washington streams would be in jeopardy," the Governor said.

"I have issued instructions that it is the State's policy to cooperate with Canada and with our neighboring states in every way to maintain and improve the coastal fisheries resources. We have also made it clear that we will exert every effort to maintain our historic

fishing rights in common with our neighbors.

"If the two countries on State Department level fail at the Geneva Conference to balance these interests, our whole salmon program and coastal bottom fisheries may be seriously affected.

"I share this concern along with Senator Warren Magnuson that it may be necessary to send someone to the Geneva meeting to at least keep us informed about what takes place at the Conference," he remarked.



Wholesale Prices, January 1960

Prices in wholesale markets for edible fishery products (fresh, frozen, and canned) declined slightly (0.7 percent) between December 1959 and January 1960 to 121.9 percent of the 1947-49 average. A weaker market for drawn and filleted haddock was chiefly the cause for the drop. From January last year to January this year the wholesale price index was down almost 10.0 percent due mainly to lower prices for fresh and frozen shrimp and drawn and filleted haddock.

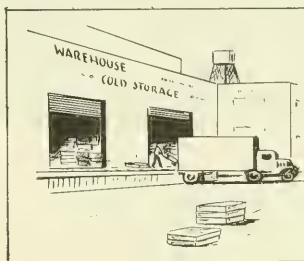


Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, January 1960 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ (\$)		Indexes (1947-49=100)			
			Jan. 1960	Dec. 1959	Jan. 1960	Dec. 1959	Nov. 1959	Jan. 1959
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					121.9	122.7	120.7	135.4
Fresh & Frozen Fishery Products:					135.1	136.4	133.4	160.6
Drawn, Dressed, or Whole Finfish:					148.7	154.8	147.2	174.1
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.13	.16	127.4	163.9	129.2	232.9
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.30	.31	93.8	96.4	95.9	103.7
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.77	.76	171.9	171.3	168.5	174.1
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.65	.47	159.9	115.3	179.7	166.1
Whitefish, L. Erie pound or gill net, rdk., fresh	New York	lb.	.80	.88	161.9	177.0	126.4	146.6
Yellow pike, L. Michigan & Huron, rnd., fresh .	New York	lb.	.71	.59	166.5	138.4	164.2	153.6
Processed, Fresh (Fish & Shellfish):					135.8	134.6	134.0	154.2
Fillers, haddock, sml., skins on, 20-lb. tins .	Boston	lb.	.44	.49	148.0	166.7	153.1	214.4
Shrimp, lge. (26-30 count), headless, fresh . .	New York	lb.	.68	.65	106.6	101.9	102.7	150.1
Oysters, shucked, standards	Norfolk	gal.	7.00	7.00	173.2	173.2	173.2	148.5
Processed, Frozen, (Fish & Shellfish):					107.9	106.8	106.4	138.9
Fillers: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.38	.38	98.1	98.1	98.8	108.6
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.31	.31	97.3	97.3	99.7	128.7
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.27	.27	108.8	108.8	108.8	124.9
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.65	.64	100.3	98.4	96.4	137.7
Canned Fishery Products:					103.8	103.8	103.4	98.9
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs. .	Seattle	cs.	24.50	24.50	127.8	127.8	127.8	114.8
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	10.80	10.80	77.9	77.9	77.9	79.3
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	8.00	8.00	93.9	93.9	88.1	91.0
Sardines, Maine, keyless oil, No. 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.75	8.75	93.1	93.1	93.1	90.1

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

Because of lower wholesale prices for large drawn haddock at Boston and frozen halibut and round whitefish at New York, the drawn, dressed, and whole finfish subgroup index declined 3.9 percent from December 1959 to January 1960. Compared with January a year ago, the subgroup index was down sharply (14.6 percent) with prices for large haddock down 45.3 percent, frozen dressed halibut down 9.5 percent, frozen dressed salmon down 1.3 percent, and Lake Superior whitefish down 3.7 percent. But wholesale prices for Great Lakes round whitefish and yellow pike were higher.

Fresh processed fish and shellfish wholesale prices in January increased by about 1.0 percent from the preceding month. An increase of about 3 cents a pound in fresh shrimp prices at New York was more than sufficient to offset a 11.2-percent drop in fresh small haddock fillet prices at Boston. Shucked oyster prices remained unchanged during the past three months. From January last year to January this year, the subgroup index declined 11.9 percent because of sharp drops of 31.0 percent in fresh haddock fillet prices and 29.0 percent in fresh shrimp prices. During the same period shucked oyster prices were higher by 16.6 percent.

The wholesale price index for frozen processed fish and shellfish in January 1960 was up 1 percent from the preceding month. A one-cent-a-pound rise in frozen headless shrimp prices at Chicago was responsible for this increase. However, a substantial decline of about 22.3 percent occurred in the wholesale price index for this subgroup from January a year ago to this January, due to lower first-hand prices for frozen fillets and frozen shrimp.

From December to January 1960 canned fish prices were unchanged, although there was some weakness in the wholesale prices for canned light meat tuna which was reflected in many types of promotional allowances rather than in listed prices. As canned tuna was the only canned fish item in good supply in January this year, prices for the other canned fish items were firm. As compared with January 1959, canned fish prices were higher by 5.0 percent this January due to higher (11.3 percent) canned pink salmon prices and lesser increases in prices for California and Maine sardines, and slightly higher tuna prices.



SHRIMP CREOLE--A TEMPTING DISH

Shrimp, one of the most versatile foods available, are in plentiful supply and are available fresh, frozen, cooked, and canned, in all parts of the country. The fine flavor and good food value of shrimp can be utilized in appetizers, soups, main dishes, and salads.

Although the recipes for Shrimp Creole may be many and varied, the home economists of the U. S. Bureau of Commercial Fisheries suggest the following recipe:

SHRIMP CREOLE

$1\frac{1}{2}$ pounds shrimp, fresh or frozen	1 teaspoon chili powder
$\frac{1}{4}$ cup chopped onion	Dash pepper
$\frac{1}{4}$ cup chopped green pepper	1 teaspoon salt
1 clove garlic, finely chopped	2 cups canned tomatoes
$\frac{1}{4}$ cup butter or other fat, melted	Rice ring
3 tablespoons flour	

Peel shrimp, remove sand veins, and wash. Cut large shrimp in half. Cook onion, green pepper, and garlic in butter until tender; blend in flour and seasonings. Add tomatoes and cook until thick, stirring constantly. Add shrimp and simmer uncovered for about 20 minutes. Serve in a rice ring. Serves 6.



International

FISHING FAIR AND NAUTICAL EXPOSITION TO BE HELD IN ITALY, JUNE 25 TO JULY 10, 1960:

The XX International Fishing Fair and the VI International Nautical Exposition will be held concurrently at Ancona, Italy, June 25 to July 10, 1960, according to an announcement by the Italian Government.

FOOD AND AGRICULTURE ORGANIZATION

EXPERT GROUP URGES GREATER STUDY OF RADIATION IN FOOD, AGRICULTURE, AND FISHERIES:

An expert committee on radioactive materials has recommended that the Food and Agriculture Organization and its member governments, when determining "the radioactivity burden of man," place greater emphasis on the importance of agriculture, fisheries, and food.

The Expert Committee on Radioactive Materials in Food and Agriculture, organized by FAO, met in Rome November 30-December 11, 1959, with scientists present from Canada, the German Federal Republic, Japan, the Netherlands, Sweden, the United Kingdom, and the United States.

The group was established to enable FAO to provide its member nations with expert opinion on the present state of knowledge of the movement and behavior of radioactive materials in food chains (uptake of radioactive isotopes from soil to plant to animals to human diet), and on survey and research programs needed to extend that knowledge.

The FAO Committee's report, now being completed, will be made available to the United Nations Scientific Committee

on the Effects of Atomic Radiation, which was scheduled to meet in January 1960.

The Chief of FAO's Atomic Energy Branch and technical secretary of the Committee; said in an interview following the meeting:

"The applications of atomic energy are unavoidably associated with the release of varying quantities of radioactive materials into the environment, which may present a potential problem since they may be taken up from soils and waters by crops and livestock, and thus enter food.

"The scientific principles underlying agriculture, fisheries, and food production and utilization are, therefore, of particular significance for a proper understanding of the way in which radioactive substances behave in food and agricultural materials. Such understanding is essential if man is to learn to live safely in the presence of the general and local rises in environmental radioactivity that may occur in this atomic age."

Among recommendations put forward by the Committee are the following:

(1) Research on metabolism of radioactive materials should be encouraged as a prelude to means of reducing potential hazard;

(2) Research on decontamination of food products should include all dietary items that are relatively important carriers of radioactive materials, in order that scientists may be prepared to cope adequately with situations that might arise in the future;

(3) Governments should provide for representation by agricultural authorities on national radioactivity committees or should establish advisory committees to

International (Contd.):

ensure collaboration among atomic energy, public health, medical and food, agricultural, and fisheries authorities in programs of research and control in radiation protection;

(4) FAO should place increased emphasis on advising member governments in their responsibilities for research on and control of environmental radiation;

(5) The Director-General of FAO should periodically convene expert committees and technical meetings and symposia on the subject.

INTERNATIONAL JOINT COMMISSION (UNITED STATES AND CANADA)

PROPOSED PASSAMAQUODDY TIDAL POWER PROJECT EFFECT ON FISHERIES SLIGHT:

The International Joint Commission (Canada and the United States) concluded a 3-day meeting with members of its International Passamaquoddy Engineering and Fisheries Boards. At the meeting held in Boston on January 13-15, 1960, the Commission was briefed by members of the boards concerning the possibilities for development of tidal power in Passamaquoddy and Cobscook Bays in Maine and New Brunswick.

The reports of the boards, which have previously been made available for examination by interested parties, indicate that an international tidal power project using the waters of Passamaquoddy and Cobscook Bays on the east coast of Canada and the United States is feasible from an engineering standpoint. There are questions, however, as to the economic feasibility of the project due to differences in interest rates in the two countries and other factors. The project would have to be combined with an auxiliary power source in order to obtain effective utilization of the tidal power. The boards also concluded that the construction, maintenance, and operation of the tidal power project, which would include fish passage facilities, would not have any significant adverse effects on the fisheries of the region.

The sessions were chiefly concerned with an analysis of the basic surveys and studies on which the board's findings were based. Also considered were the economic and financial aspects of the project reported upon by the boards.

Other factors requiring further consideration by the Commission include: the impact of the proposed project on the economies of the area; the significance of recreational benefits which may result from construction of the project; and evaluation of possible benefits peculiar to this unique project.

In order that the Commission may have the benefit of the views of all who are interested in this unique project, it has been decided that public hearings will be held in Maine and New Brunswick, Canada. An announcement will be made later of the time and place of such hearings.

INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION

SALMON FISHING REGULATIONS FOR 1960 IN CONVENTION WATERS:

The tentative suggestions for regulatory control of the United States and Canadian 1960 sockeye or red salmon fishery in Convention waters in British Columbia and the State of Washington as submitted to the fishing industry on December 11,

1959, were discussed and reconsidered in view of suggestions submitted by the Advisory Committee at a meeting held by the Commission on January 19, 1960. Action taken by the Commission in modifying the original proposals is detailed as follows:

1. An analysis of the originally proposed closure in Juan de Fuca Strait scheduled for the period August 7 to 28 revealed that the limitation of fishing to three days weekly prior to August 7 actually made the effective starting date of the projected closure August 4 instead of August 7. In view of possible interference by the originally suggested closure period with an allowable full participation in the Chilko run, two days of fishing were added to the week commencing August 7.

2. Decision on the daily opening and closing hours for purse seines and gill nets in Canadian Area 20 was delayed by request pending possible agreement between the two types of fishermen operating in the area.

3. In the event of an emergency closure of Canadian District 1 for the conservation of sockeye during the period September 9 to 30, approval was given to the use of spring salmon nets under government regulation.

4. Approval was given to a proposal that a complete closure of United States Convention waters lying easterly of the Angeles Point-William Head line from August 14 to 28 followed by a relinquishment of regulatory control on the latter date be substituted for the original suggestion of a two-day fishing week for the period August 14 to September 18.

Recommendations Approved for Regulatory Control of Sockeye and Pink Salmon Fishing in Convention Waters for 1960

UNITED STATES CONVENTION WATERS:

All United States Convention Waters:

Closed June 20 to July 18 - except for spring salmon nets in waters easterly of the William Head-Angeles Point line under regulation by the State of Washington but having a mesh of not less than 8½ inches.

West of William Head-Angeles Point Line:

July 18 to August 7 - purse seines open daily 4:00 a.m. to 8:00 p.m. Monday through Wednesday. Gill nets open daily 6:00 p.m. to 8:00 a.m. Monday afternoon to Thursday morning.

August 7 to August 14 - purse seines open daily 4:00 a.m. to 8:00 p.m. Monday and Tuesday only. Gill nets open daily 6:00 p.m. to 8:00 a.m. Monday afternoon to Wednesday morning.

August 14 to August 28 - closed.

East of William Head-Angeles Point Line:

July 18 to August 14 - purse seines and reef nets open daily 4:00 a.m. to 8:00 p.m. Monday through Thursday. Gill nets open daily 6:00 p.m. to 8:00 a.m. Monday afternoon to Friday morning.

August 14 to August 28 - closed.

International (Contd.):

CANADIAN CONVENTION WATERS:

West of William Head-Angeles Point Line:

June 20 to July 17 - closed.

July 17 to August 7 - purse seines open daily 12 hours* Monday through Wednesday. Gill nets open daily 12 hours* Sunday afternoon to Wednesday morning.

* Establishing of daily opening and closing hours delayed pending agreement between fishermen.

August 7 to August 14 - purse seines open daily 12 hours* Monday and Tuesday only. Gill nets open daily 12 hours* Sunday afternoon to Tuesday morning.

* Establishing of daily opening and closing hours delayed pending agreement between fishermen.

August 14 to August 28 - closed.

East of William Head-Angeles Point Line:

June 27 to August 14 - open 7:00 a.m. Monday to 7:00 a.m. Thursday.

August 14 to October 2 - open 7:00 a.m. Wednesday provided that in the case of emergency closures of District No. 1 during the period September 9 to 30, as required for the conservation of sockeye, fishing for spring salmon may be permitted under regulations by the Department of Fisheries with nets having a mesh of not less than 9 inches for linen nets and 9½ inches for nylon nets.

Note: All times mentioned are Pacific Standard Time.

TRADE AGREEMENTS

UNITED KINGDOM-TUNISIA
AGREEMENT INCLUDES
FISHERY PRODUCTS:

A trade agreement between the Tunisian Republic and the United Kingdom (signed at Tunis on November 16, 1959), valid for a year effective November 1, 1959, replaces the former "arrangement" between the two countries. The agreement provides for the exchange of some fishery products between the two nations and includes the following: Tunisian fishery products that may be imported into the United Kingdom without restrictions are fresh fish, dried octopus, shellfish (particularly shrimp and lobster), snails (probably land snails), canned fish, washed sponges, and cuttlefish bone. Tunisian fishery products that may be imported into the United Kingdom Overseas Territories are canned fish (particularly sardines). British fishery products that may be imported into Tunisia from the United Kingdom under quota are only salted, smoked, and frozen fish valued at £1,000 (US\$2,800).

It is not known whether the new agreement will result in increased trade between the two countries. (United States Embassy report from Tunis, November 17, 1959.)



Angola

FISHING INDUSTRY SUFFERS FROM
LOWER LANDINGS AND EXPORTS:

While Angola's fisheries exports continued to decline from 1958, fish landings were more encouraging. Comparing half-yearly data for 1959 with that of 1958, the sardine catch was up almost 50 percent from 10,309 metric tons worth 5,388 contos (US\$187,000) ex-vessel in 1958 to 19,226 metric tons worth 7,777 contos (\$271,000) in 1959. The increase was felt in both the Lobito/Benguela and the Mocamedes/Porto Alexandre areas. However, the catch of carapau (*Selar crumenophthalmus* Bloch), another important source of fish meal and oil, was down 12 percent to 39,114 tons and the value declined 39 percent to 16,814 contos (\$585,000). A 14-percent increase in the catch of carapau at Mocamedes/Porto Alexandre was offset by a decline of almost 50 percent at Lobito/Benguela. Over-all fish landings declined from 108,051 tons in January-June 1958 to 101,544 tons in January-June 1959 and the value from 67,355 contos (\$2,343,000) to 56,830 contos (\$1,977,000). This decline was felt at all the major fishing centers.

Exports of the principal fishery products (fish meal, dried fish, canned fish, and fish oil) during the first ten months of 1959 were down by 28.7 percent in quantity and 15.7 percent in value as compared with the same period of 1958. Fish meal (the most important fishery export) exports (40,960 metric tons) declined by about 30.3 percent in January-October 1959 from the 58,736 tons exported during January-October 1958.

The problems of the fishing industry were brought up once again before the Angolan Legislative Council which held its semiannual session in October 1959. Taking note of this debate, the Minister of Overseas in Lisbon suggested the creation of a special fund to assist the industry. On a short-term basis he suggested that Angolan officials consider

Angola (Contd.):

Table 1 - Angolan Exports of Fishery Products, January-October 1958-59						
Product	January-October 1959			January-October 1958		
	Quantity	Value		Quantity	Value	
	Metric Tons	1,000 Escudos	US\$	Metric Tons	1,000 Escudos	US\$
Fish meal	40,960	168,832	5,872	58,736	195,059	6,785
Dried fish	10,924	59,499	2,070	13,333	71,603	2,491
Canned fish	1,069	16,679	580	1,108	17,239	600
Fish oil	3,194	13,381	465	5,592	22,704	790
Total	56,147	258,391	8,987	78,769	306,605	10,666

the usefulness of the following emergency measures: (1) suspension of all export duties covering fish products; (2) creation of an additional income tax for all taxpayers; and (3) increasing the gasoline tax. Suspension of the export tax would ease the financial pressure on the firms, many of which are threatened with bankruptcy; and a tax would finance necessary credits to hard-pressed companies.

An extraordinary meeting of the Legislative Council on November 19, 1959, convoked solely to discuss the fishing problem, endorsed the first recommendation, strongly opposed the second, and called for further discussion of the third. The matter has been referred to Lisbon again for consideration by the Minister of Overseas.

One local newspaper has reported that the Ministry has taken action, but there has been no official confirmation of this, and the report may be wishful thinking. This source stated that the approved measures included: (1) establishment of a credit system financed and administered by the government on the basis of issuing bonds repayable in 18 years; (2) debts owed by the industry to the fishing guilds would be changed into loans repayable in 10 annual installments; (3) an Institute of Fishing of Angola would be established and the fishing guilds would be abolished, and (4) the guilds or the institute would no longer act as the seller of fish products as has been the practice.

As of October 1959, the only action taken from the recommendations of the various meetings has been the decision of the Angolan Government to waive payment of the income tax for 1959 by the fisheries industries.

The proposal to establish a credit system or credit institution has been strongly endorsed by the fishing industry for some time. Indeed, all the suggestions of the Minister of Overseas have been among those considered over the past two years. The important point for the industry was that the government was at last suggesting forms of specific assistance that it would give rather than continuing discussions in generalities.

Portuguese authorities wisely see that the problems of the fish industry are both short- and long-term. The immediate problems relate to the easing of the financial crisis facing the fishing companies. While all agree on the need for credit, financing this credit is quite another matter, since taxes are fairly heavy in Angola and the whole economy is in the throes of a recession with no signs of an upturn in the near future. The economy is in a poor position to support the fisheries industry for a long period just at a time when the coffee industry is also going to require some kind of public assistance. Thus, the strong rejection of the suggestion of an additional income tax to be borne by all represented sound reasoning. A gasoline tax increase, which may be approved, would be less damaging to the economy. The long-term bond issuance proposal mentioned by the press would be even more suitable to present conditions.

The long-term problem was only noted in recent discussions, the main emphasis being on the immediate financial crisis. Part of the program to get at the heart of the matter in the long run is to be a full study of the operation of the industry, the technical reasons behind the decline of the fish catch, and technical assistance. (United States Consulate in Luanda, December 12, 1959.)

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Angola (Contd.):

FUND ESTABLISHED TO SUPPORT THE FISHING INDUSTRY:

The Fundo de Apoio a Pesca (Fund to Support the Fishing Industry) was created by Legislative Decree No. 3,028 of December 23, 1959. The Fund is intended to provide short-term credits to Angolan fishing industry firms and the fishing guilds. It is to be supervised by an Administrative Commission composed of a president and no more than four delegates appointed by the Government General.

The Fund is to have its own annual budget together with a subsidy from the government budget, the amount of which is to be determined each year. The budget is to be financed by a gasoline tax of 20 centavos (US\$0.007) per liter effective February 15, 1960, which is expected to produce 14,000 contos (US\$490,000) each year. It is not known if this is to be the only source of funds for the Fund's annual budget since the size of that budget has not yet been announced. The subsidy for 1960 is to be 3,000 contos (\$105,000) (United States Consulate report from Luanda, January 18, 1960.)

**Australia****SURVEY SEEKS NEW SHRIMP FISHING GROUNDS:**

An intensive survey for new shrimp grounds off Australia's east coast was initiated early in November 1959 by the trawler *Challenge*, under the supervision of the Fisheries Division of the Department of Primary Industry. The survey is financed from the Fisheries Development Trust Account and was scheduled for 28 weeks.

Exploratory shrimp fishing was started at Moreton Island, off Queensland's south coast, and extended as far south as Lakes Entrance in Victoria. The investigators hope to find new areas for fishing king and tiger shrimp and the new species located in deep water off Broken Bay, New South Wales, during a previous survey.

"This is a continuation of survey work already undertaken in past seasons on our potential shrimp fisheries by the officers of the Fisheries Division. It is a project which has already led to the discovery of the now widely-known Tin Can Bay shrimp grounds off Queensland's south coast and to the finding of king shrimp off Lakes Entrance where bad weather prevented the completion of survey work in March 1959. This further work should determine whether they exist in commercial quantities in this area," an official stated.

The survey will have as its main objective the search for shrimp grounds beyond a depth of 30 fathoms. The survey will extend beyond the continental shelf to depths of 150-160 fathoms.

"The *Challenge* may yet secure a place in Eastern Australian shrimp history because during the most recent survey undertaken by the vessel a large species of shrimp, believed to be previously unknown in Australian waters, was found in 150 fathoms off Broken Bay. If the shrimp proves to be a new species it is likely to be named after the *Challenge*," the official added.

The main aims of the survey are to determine whether commercial quantities of shrimp exist in the area surveyed, to define suitable areas in relation to types of sea bed, and to test and develop new types of shrimp fishing gear, especially for fishing the deeper beds.

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SCALLOP CATCH UP IN TASMANIA:

With slightly fewer vessels operating than in 1958, Tasmanian scallop production in the 1959 season (May-July) increased by 74,000 pounds to 907,832 pounds (meats only). In the D'Entrecasteaux area of Tasmania 574,732 pounds were landed, 14,003 pounds in Norfolk Bay area, and 319,097 pounds in the East Coast area. Fishing was concentrated in the Channel Area, mainly Great Taylor's Bay, during May and then moved to the East Coast in June and July.

Some 80 boats operated in the Channel at the commencement of the season and 9 on the East Coast, but towards the close of the season there were some 40 vessels operating on the East Coast.

Very good catches in comparatively deep water were made possible by operating the Baird type of sledge dredge. This dredge caused considerable controversy by its use in the Channel in the early part of the season, and following strong protests it was banned from the Channel by law.

The area bounded by Gordon Jetty, Huon, and Woody Islands, Alonnah Jetty, and the northern point of Sheepwash Bay was closed against dredging owing to a preponderance of small young scallops. Owing to the intensive dredging in the Channel in recent years, it was thought that production in the area would decline for some years, but this would be offset to a large extent by the exploitation of the new beds on the East Coast where prospects were most encouraging.

Norfolk Bay Area proved very disappointing and was not expected to return good catches for several years. (Australian Fisheries Newsletter, November 1959.)



Brazil

FISH PROCESSING PLANT COMPLETED:

On November 16, 1959, a new fish processing plant located at Maracana, Brazil (near mouth of the Amazon River), was completed. It was originally scheduled for completion in June 1959. The plant has modern machinery and equipment, including freezers with a capacity of 132,000 pounds of fish. It has a fish canning capacity of 100,000 cans a day and is expected to employ 300 workers. The plant is equipped with a powerhouse, ice-making machinery, and space for canning and printing labels. In addition, the new plant has space and equipment for processing Newfoundland cod. The total investment was Cr\$87 million (about US\$458,000) of which Cr\$60 million (about US\$316,000) was financed with Government aid. (United States Consulate report from Belem, December 4, 1959.)

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SHRIMP FISHING INDUSTRY:

Although Brazil, with a coastline of about 3,500 nautical miles, has fishing grounds suitable for shrimp fishing, especially along the coast between Rio de Janeiro and Rio Grande do Sul, it has no organized shrimp industry. There are no boats under the Brazilian flag built and equipped specifically for shrimp fishing. Shrimp fishing is carried on in any type of vessel and, more frequently than not, with inadequate equipment. Lack of adequate cold-storage facilities, even in such major fishing centers as the cities of Rio de Janeiro and Santos, make it necessary for much of the shrimp catch to be sold unfrozen either in the retail fish outlets or in the open-air markets. Shrimp exports from Brazil are negligible.

Landings: The landings of shrimp in Brazil in 1958 amounted to 18,557 metric tons valued at Cr\$434.5 million (US\$2.2 million) ex-vessel, as compared with 20,667 tons valued at Cr\$315.4 million (US\$1.6 million) in 1957, and 17,305 tons valued at Cr\$285.1 million (US\$1.4 million) in 1956.

Vessels: There are no modern vessels fishing specifically for shrimp in Brazil. However, the Brazilian Ministry of Agriculture is considering the purchase of a shrimp vessel in collaboration with the Oceanic Institute of the University of Sao Paulo. In addition, a private firm being organized in Rio de Janeiro hopes to purchase three small shrimp vessels and begin operations before July 1, 1961.

Ex-Vessel Price: As most shrimp caught in Brazilian waters is consumed on the domestic market and because of inadequate refrigeration facilities, the price per kilo varies from day to day. Excess shrimp is dried and salted for retail in grocery stores. The ex-vessel prices may vary from Cr\$50 per kilo (about 11.4 U.S. cents a pound) for the smaller and less desirable varieties to Cr\$200 per kilo (about 45.5 cents a pound) for large whites. It is believed that companies purchasing large and medium white shrimp ex-vessel for export pay about Cr\$150 per kilo (about 34.1 cents a pound).

Exports: Export prices for frozen shrimp in December 1959 were about Cr\$300 per kilo (about 45.5 cents a pound) for large and medium whites; however, prices often vary considerably due to the instability of the cruzeiro. Because of the inflationary period through which Brazil is

passing, it may be expected that the cruzeiro value of shrimp will continue to increase. Exports of fresh and frozen shrimp in 1958 totaled 14,400 pounds and during the first six months of 1959 amounted to 12,300 pounds. Canned shrimp exports in 1958 amounted to 92,300 pounds and only 6,100 pounds during January-June 1959. With modern boats and facilities for processing and freezing, it is probable that Brazil could increase its exports of shrimp sharply.

Table 1 - Brazil's Exports of Processed Shrimp, 1957-58 and January-June 1959

Country of Destination	January-June 1959			1958:	1957:
	Qty.		Value	Qty.	Qty.
	1,000 Lbs.	1,000 Cr\$	US\$	1,000 Lbs.	1,000 Lbs.
Fresh or frozen:					
United States	1.3	103	516	14.4	-
British W. Indies	5.4	501	2,511	-	-
Dutch W. Indies	3.9	351	1,759	-	-
Cuba	0.4	35	175	-	-
Malaya & Singapore . . .	0.9	91	456	-	-
Mozambique	0.4	25	125	-	-
Total	12.3	1,106	5,542	14.4	-
Canned shrimp:					
Canada	-	-	-	90.0	37.0
Union of South Africa . .	-	-	-	2.3	-
Dutch W. Indies	3.8	330	1,654	-	-
Belgium	1.8	177	887	-	-
Labanon	0.5	44	221	-	-
Total	6.1	551	2,762	92.3	37.0

1 Values for 1957 and 1958 omitted due to uncertainty as to exchange rate.
Note: Values converted at Cr\$199.50 = US\$1.

Current Export Controls or Taxes: Shrimp may be freely exported from Brazil, provided that the exporter obtains an export license from the Foreign Trade Department (CACEX) of the Bank of Brazil and a Sanitary Certificate ("Certificado de Sanidade"), certifying to the good condition of the shrimp, from the Ministry of Agriculture. Although there is no Federal export tax on shrimp, some states levy export taxes (e.g., Santa Catarina has a 5 percent tax) on shrimp exports.



Burma

SHRIMP INDUSTRY:

According to estimates by the Burma Department of Fisheries (no official statistics are available), annual shrimp landings total 1,000-1,500 metric tons valued at about US\$35,000-\$45,000.

The Burma Defense Services Institute has a joint venture agreement with a Singapore firm to provide 14 trawlers to fish the Limpit Island area (about 80 miles off Mergue Coast). The Singapore firm receives 35 percent of the catch.

No shrimp are exported and there are no present plans to expand the shrimp fishery. (United States Embassy report from Rangoon, December 17, 1959.)

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Canada

DANISH SEINE FISHERY FOR FLOUNDERS SUCCESSFUL:

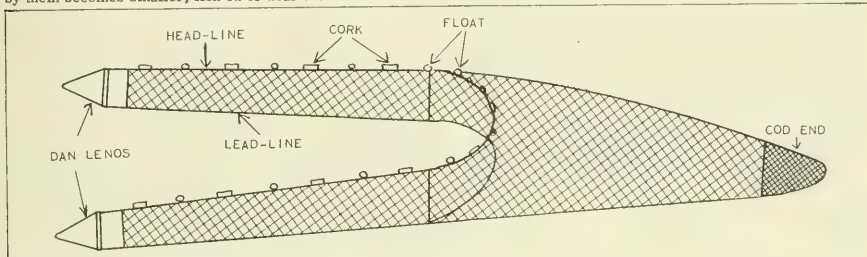
Starting in the spring of 1959 on the west of Cape Breton Island, Nova Scotia, Danish seine-net fishing operations have paid off far beyond expectations, it is reported in the Canadian Department of Fisheries journal *Trade News* of December 1959. Six boats have already been fitted (September 1959) with the gear, and two more are to join them.

The seining operation is relatively simple. It consists of surrounding a large area of sea bed with two very long ropes—each is almost a mile in length—and a net, in such a way that when the ropes are pulled in and the area enclosed by them becomes smaller, fish on or near the bottom are

that date until June 13, 1959, he had landed close to 200,000 pounds of flounders.

Soon the pioneer fishermen's colleagues had their boats equipped with Danish seines. By the middle of June, six Cheticamp boats were on the grounds. Right from the beginning the operations paid off. Catches have been running as high as 50,000 pounds in five days. Some boats have had daily catches as high as 25,000 pounds. At 3-1/2 cents a pound, 25,000 pounds of flounders is a profitable operation for a boat under 60 feet in length with a crew of four men.

The Cheticamp fishermen have voluntarily adopted a 5-1/4 inch mesh which enables small fish to escape. This mesh size adopted by the Cheticamp seiners is larger than the 4-1/2 inch mesh adopted by the 12-member countries of the International Commission for Northwest Atlantic Fisheries.



The net used in Danish seining. Set out with wings stretched wide apart, the net catches fish in a manner similar to that of the otter trawl as it is drawn along the bottom.

driven into the center where they are collected by the moving net. It can be operated only on grounds that are smooth and free of strong current and obstacles.

It was in 1951 that the Newfoundland Government first conducted investigations to determine if that method of fishing could be employed in Newfoundland waters. A Danish seine fishing ground for gray sole was discovered on the province's south coast, and commercial exploitation began in 1952.

In 1953-1954 fishery scientists, using the Newfoundland exploration vessel *Matthew II*, continued the research off Newfoundland and in Gulf of St. Lawrence waters west of Cape Breton. Results in the latter case were excellent. Near the shore of Cape Breton is a deep channel, the western side of which slopes gradually toward the Magdalen Islands. In the area was found a large expanse of sea bottom suitable for Danish seining. Experimental sets made in depths up to 40 fathoms produced excellent catches varying from 4,000-9,000 pounds of gray sole and sea dab.

It was this technological investigation that sparked Nova Scotia's interest in the seining technique. Potentiality of that type of fishing in Nova Scotia waters was immediately evident to the Industrial Development Service of the Department of Fisheries and also the Fisheries Division of the Nova Scotia Department of Trade and Industry.

One of the first steps was the acquisition of Danish seining equipment, and the first unit was put into operation out of Queensport, Nova Scotia. The provincial department hired an Icelandic fisherman to instruct fishermen in the use of the gear.

In cooperation with the Federal Department's Industrial Development Service, the provincial fishery agency successfully prosecuted the initial project. The two agencies combined to produce a suitable winch for hauling the gear. Constructed originally with two automobile rear-axle units, the winch is now being manufactured near Pictou. The original design has been modified and it is now a highly efficient piece of machinery.

One of the pioneers of Danish seining in Cheticamp is the master of the *Lady of Fatima*. He fitted his boat during the winter and on May 1 he was off to the fishing grounds. From

On top of that the catch is carefully culled aboard so that unmarketable fish can be thrown back into the sea to be fished another day.

Since seining was started in this area the vessels have been averaging between C\$650 and C\$700 a trip. Average landings have been in the vicinity of 20,000 pounds. One vessel in 10 trips landed 192,967 pounds of flounders, for a total fare of C\$6,690. In seven trips another vessel landed more than 128,000 pounds to bring the skipper and crew nearly C\$4,400.



Colombia

TUNA LANDINGS IN BARRANQUILLA:

Fresh tuna landed by the Japanese tuna long-liner *Seiun Maru* helped reduce retail food costs in Barranquilla, Colombia, during December 1959. The vessel delivered over 200 metric tons of tuna to its shoreside affiliate, for distribution throughout the city at the authorized price of two pesos (about 26 U. S. cents) a pound.

The *Seiun Maru* was due to return to Japan for overhauling, but will be replaced by another vessel from Japan. (U. S. Consulate report from Barranquilla, December 30, 1959.)



Costa Rica

SHRIMP INDUSTRY:

Landings: Shrimp landings in Costa Rica increased sharply beginning about June 1958 and totaled about 1.5 million pounds for the 12 months ending May 1959. The sharp increase in the landings in 1958 and continuing into 1959 was due to an increase in the shrimp fishing fleet from 17 vessels active prior to June 1958 to 28 Diesel-powered vessels active as of November 1959. In August 1959 a peak total of 33 vessels was engaged in shrimp fishing. About 10 vessels are 55 to 60 feet in length and the remainder 25 to 40 feet. About 20 shrimp trawlers (varying from 45 to 60 feet in length) are reported under construction in Puntarenas. But it is probable that many of them may not be completed because of lower catches and prices.

All the shrimp catch is taken in the Pacific Ocean and the fishing grounds are limited to three small areas. Due to the small areas available for shrimp fishing, it is believed that the landings of about 1.5 million pounds from June 1958 to May 1959 represent the peak production possible from Costa Rica's Pacific coast and future landings will probably level off to a total somewhat smaller.

Table 1 - Shrimp Landings in Costa Rica, 1956-58 and Jan.-Oct. 1959

Period	Large 1/	Small 2/	Total
	(1,000 Lbs.)		
1959 (Jan.-Oct.)	1,002	168	1,170
1958	790	140	930
1957	191	180	371
1956	424	95	519

1/Headless shrimp 2/Head-on shrimp

Shrimp landed in Costa Rica are not classified as to species in official records. Observers estimate that about 99 percent of the catches consist of *Penaeus occidentalis* and *P. stylirostris* with about two-thirds of the landings consisting of *P. occidentalis*. The remaining 1 percent of the landings consists of *P. vannamei*, *P. californiensis*, and *P. brevis*. The small brown shrimp which are consumed locally are principally *Litopenaeus setiferus*.

Landings of large headless shrimp for the first 10 months of 1959 amounted to 1 million pounds, or about 26.7 percent more than the 790,000 pounds landed in 1958. The landings in 1958 were over three times the 191,000 pounds of large shrimp landed in 1957 and about 86.6 percent higher than the landings made in 1956.

Table 2 - Costa Rica's Shrimp Landings by Months, 1958-59

Month	No. Vessels Fishing	1959		1958	
		Large 1/	Small 2/	Large 1/	Small 2/
		(1,000 Lbs.)			
January	24	143	10	11	3/
February	26	145	13	14	1
March	28	158	17	26	1
April	29	131	38	45	10
May	31	114	30	22	10
June	32	83	7	81	4
July	33	90	9	85	6
August	33	92	12	82	16
September	28	38	17	80	17
October	28	48	15	73	26
November	-	-	-	127	20
December	-	-	-	144	27
Total	292	1,002	168	790	140

1/Headless shrimp 2/Head-on shrimp 3/ Less than 500 lbs.

Ex-Vessel Prices: At the vessel level shrimp is sold in only two categories--large headless shrimp and heads-on small or "brown" shrimp. These two types are not broken down any finer at the vessel level.

Ex-vessel prices on November 16, 1959, for large headless shrimp were three colones (47 U.S. cents) a pound for headless large shrimp and one colon (16 cents) a pound for small shrimp with heads on. (The free rate for the colon is 6.63 to one U.S. dollar, but due to export controls the rate on ex-

ported shrimp averages 6.27 colones to one dollar.) In August 1959 the price of large shrimp was reduced from 3.50 to 3.00 colones (59 to 47 cents) a pound. No reduction was made in the price of small shrimp.

Production Costs: The cost of catching shrimp in Costa Rica as of November 1959 (based on average monthly landings of 5,000 pounds of headless shrimp per vessel per month, but catches were averaging less in the fall of 1959) amounted to about 33 U.S. cents a pound. Per vessel the gross profit was about US\$750. The cost of depreciation and insurance has been omitted from the calculations because finfish caught and landed by the shrimp vessels is believed to be valuable enough to take care of those costs.

Table 3 - Estimated Monthly Costs for Catching Shrimp in Costa Rica with a Modern 60-Foot Trawler 1/ Averaging 5,000 Pounds of Large Headless Shrimp a Month, November 1959

	Colones	US\$	Cost per Lb. in U. S. c.
Crew share 2/...	4,050	646	12.9
Fuel and oil	2,000	319	6.4
Ice	1,260	201	4.0
Gear	2,000	319	6.4
Upkeep of vessel	1,000	159	3.2
Total	10,310	1,644	32.9
Sale of shrimp	15,000	2,392	47.9
Profit	4,690	748	15.0

1/Valued at 250,000 colones (about US\$40,000).

2/Percentage share of 27 percent with an ex-vessel price of 3 colones (47 U. S. cents) was used.

Note: Values converted at rate of 6.27 colones = US\$1.

The crews consist of 4 or 5 men who furnish their own food. Crews are paid on a percentage basis of the catch. This percentage varies between 25 and 33 percent in accordance with the quality of the boat. The better boats pay the smaller percentage.

Fuel and oil in table 3 is figured on the basis of 2,000 gallons of Diesel at 99 centavos (16 cents) a gallon and allowing 1 centavo (0.16 cents) for oil costs for each gallon of Diesel oil used.

Ice in table 3 was on basis of 140 blocks of ice at 9 colones (\$1.44) per block.

In table 3 under gear are included nets, boards, cables etc. This includes one new net a month which seems somewhat high, but perhaps with double-rig this may be true.

Processing Costs: The cost of a pound of frozen headless shrimp landed in Miami, Fla., in November 1959 was about 68.4 cents a pound and breaks down as follows: 47 U.S. cents was paid to the vessels; 5 cents for dock charges, grading, and packing; 3.5 cents for cartons, cases, and strapping; 2.5 cents for glazing, freezing, and storage; 1.0 cent for transportation from Puntarenas to San Jose; 2.5 cents for loss in exchange control (35 percent of export dollars are converted at 5.60 colones and 65 percent at the free rate of 6.63 colones to US\$1); 1.4 cents for export tax of 2 percent (normal export price is 70 cents a pound); and 5.5 cents a pound (net weight) for air freight to Miami. To New Orleans the freight amounts to 7.7 cents.

Table 4 - Costa Rica's Exports of Frozen Headless Shrimp, 1956-58 and January-June 1959, from Costa Rican Records

Country of Destination	Jan.-June 1959		1958		1957		1956	
	1,000 Lbs.	US\$	1,000 Lbs.	US\$	1,000 Lbs.	US\$	1,000 Lbs.	US\$
United States	476	230	427	255	217	92	484	213
Other	30	19	12	12	13	6	8	3
Total	506	249	439	267	230	98	492	216

Costa Rica (Contd.):

	Jan.-June				1957		1956	
	1959		1958		1957		1956	
	1,000 Lbs.	US\$	1,000 Lbs.	US\$	1,000 Lbs.	US\$	1,000 Lbs.	US\$
United States	853	-	717	435	227	99	421	205

Shrimp Exports: Shrimp exports from Costa Rica are principally to the United States. Official Costa Rican statistical records of exports to the United States in some years vary considerably from United States Customs records. Official Costa Rican exports of frozen headless shrimp to the United States for January-June 1959 show 506,000 pounds (U.S. Customs records for same period, 853,000 pounds). The value of shrimp (f.o.b. Costa Rica (based on Costa Rican statistics for January-June 1959) was 48.2 U.S. cents a pound as compared with 59.7 cents for the 1958 exports. However, the f.o.b. value of 48.2 cents a pound for January-June 1959 was 5.9 and 4.3 cents a pound above the 1956 and 1957 values, respectively. The large shrimp are exported as white shrimp. Probably 90 percent of the exports and landings are shrimp of the size 20 headless shrimp to the pound or larger. There are practically no exports of 30-count headless shrimp, except in the peeled and deveined category. (United States Embassy report from Mexico, November 27, 1959.)



Cuba

SHRIMP FISHERY TRENDS, DECEMBER 1959:

During 1958 Cuban shrimp landings were about 2.7 million pounds (heads-off) and exports (almost all to the United States) amounted to 390,000 pounds (headless). Following the change in the Cuban Government, the shrimp industry since November 1959 has been gradually absorbed by the National Institute of Agrarian Reform, which apparently will convert it into a cooperative enterprise operated by the shrimp fishermen.

The shrimp fishing fleet in 1959 was estimated to consist of 25-30 vessels. All are Diesel-powered and average about 45 feet in length over-all. The present fleet is believed to be adequate to exploit the shrimp fishing grounds known at present. No construction of new shrimp fishing vessels is under way and future plans under the Agrarian Reform plan are unknown.

Prior to the present unsettled condition of the shrimp fishing industry, the fishermen were paid 23 U. S. cents a pound for heads-off shrimp. Very small shrimp brought 10 cents a pound to the

fishermen. Costs of sorting, packing, freezing, storing, and other handling amounted to about 15 U. S. cents a pound.

There are no export controls or taxes applicable to the export of Cuban shrimp. The new Cuban Government is anxious to encourage industries with export possibilities in order to lessen its dependence on the sugar crop. The future of private enterprise in the shrimp and other segments of the fishing industry is uncertain. The largest shrimp-producing firm had its vessels and shore facilities taken over in November 1959 and the remaining vessels and facilities were absorbed in December. It remains to be seen what impact these measures will have on shrimp landings, prices, quality, and exports. (United States Embassy report from Havana, December 1, 1959.)



Denmark

FISHERIES IN THE EUROPEAN FREE TRADE AREA:

An analysis of the trade problems confronting Danish fisheries as a result of Denmark's membership in the European Free Trade Area (United Kingdom, Switzerland, Portugal, Austria, Norway, Sweden, and Denmark) is contained in an article ("The Market Plans") in the 1960 edition of the *Fisheries Yearbook* published by the Danish Ministry of Fisheries. The article discusses: (1) negotiations toward the EFTA; (2) position of fish within the EFTA; (3) present treatment of fish imports by members of the EFTA; and (4) Danish fish exports to EEC and EFTA nations.

After the negotiations within the Organization of European Economic Cooperation (OEEC) for a broad free trade area came to a stop, those OEEC nations remaining outside the European Economic Community (EEC) or Common Market feared that their exports to the EEC would be adversely affected. This was especially true for the industrial nations, and thus it was England and Sweden who took the initiative in forming the EFTA.

Originally, Denmark feared that the establishment of two market areas would

Denmark (Contd.):

lead to a trade war between them. Then Denmark would be dangerously situated with one of its two principal customers (England and Germany) belonging to each area. In the later negotiations toward the EFTA, Denmark managed to have it firmly established that the EFTA would first and foremost strive for renewed negotiations with the EEC for a closer connection with it.

During the negotiations toward the EFTA Denmark supported the Norwegian proposal that frozen and canned fish preserves, fish meal and fish and whale oil be treated as industrial products, and that a special agreement be negotiated concerning fresh fish and other fish products. Denmark also emphasized the Danish and Faroese interest in the removal of the United Kingdom duty on fresh fish.

A meeting of ministers was necessary to iron out several of the important differences over fish with the result that the following products will be treated as industrial goods within the EFTA: (1) canned and half-frozen fish, crabs and shellfish; (2) frozen fish fillets; (3) frozen, peeled, deep sea shrimp (prawn); (4) fats and oils from fish and sea animals; (5) fish flour; (6) fish solubles; and (7) meal from algae, seaweed, etc., for use as animal fodder.

With regard to frozen fillets the negotiations were extremely difficult. Denmark and Norway placed great importance on obtaining free entry to the British market. In 1958 Danish and Norwegian exports of frozen fillets to the United Kingdom were only 3,500 metric tons and 1,000 tons, respectively, but there is no doubt that the future will bring a great increase in the consumption of fillets. After the greatest reluctance from the British side an arrangement was finally agreed upon that the British customs duties and import taxes would be abolished on the condition that imports from Denmark, Norway, and Sweden would be increased gradually and not exceed 24,000 tons a year by January 1, 1970. If imports exceed 24,000 tons before that time, the United Kingdom, unless a special agreement concerning trade is reached by the Council of the EFTA, can withdraw the tariff concession in order to reduce imports to this amount. Great Brit-

ain has also reserved the right to reopen the question of a tariff on frozen fillets if the conditions of competition should be fundamentally altered (and by this was meant a broadening of fishing rights in territorial waters). Denmark and Norway have not been able to acknowledge this condition insofar as there may be a broadening in agreement with internationally-recognized rules.

With respect to the fish and fish products which are not to be treated as industrial goods under the treaty, which include fresh, salted, or smoked fish, and frozen fish other than fillets, it is provided in the treaty that the purpose shall be to provide for an increase in trade in these products so that there will come about a reasonable degree of reciprocity for those nations whose economy to a great extent is dependent upon the export of these fish products. Before January 1, 1961, the Council of the EFTA is to undertake an investigation of the various conditions governing trade in these products, naturally with the purpose of increasing free trade. The Council is also empowered to transfer individual fish products to that group which is treated as industrial products.

Naturally these results are not wholly what Denmark would have wished, but it is important to note that the Council of the EFTA will, in the course of the coming year, investigate the question of the inclusion of fresh fish. It is necessary that the Danish fisheries industry make its position on this question clear, because the tariff concessions which can be obtained within the EFTA if fresh fish is eventually accepted as an industrial product are largely confined to the existing United Kingdom duty of 10 percent. Quantitative restrictions against the import of fresh fish exist, practically speaking, only in Sweden and Denmark. One must remember that if fresh fish is treated as an industrial product, then the other rules of the treaty will also apply to fresh fish, namely, the right of free establishment of business.

The Faroes and Greenland for the time being will remain outside the EFTA, but can join merely by an announcement from the Danish Government.

To assess the significance of the provisions of the EFTA treaty concerning fisheries one must first be fully acquainted with the present treatment of fish by the

Denmark (Contd.):

members of the EFTA. As mentioned above, quantitative restrictions play only a small part but customs duties vary considerably from nation to nation.

In the United Kingdom there is an ad-valorem tariff which averages about 10 percent on fresh and canned fish. For lobster and shrimp the duty is 30 percent. On fish flour the duty is usually 10 percent, but herring flour is customs free.

In Norway there is generally no tariff on fresh, frozen, or salted fish, but on canned fish there are varying duties, gen-

The duties in Portugal have scarcely so much interest but it can be mentioned that they are about 2 Danish kroner per kilo on canned fish. The duty on cod is minimal. (U. S. Embassy report from Copenhagen, December 29, 1959.)

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FISHERY PRODUCTS INCLUDED IN TRADE AGREEMENT WITH EAST GERMANY:

Following negotiations held in Copenhagen and East Berlin, a new unofficial trade agreement for the calendar year 1960 was concluded on November 13, 1959,

Table 1 - Danish Proposed¹ and Actual Exports of Fishery Products to East Germany, 1956-1960

Fishery Products	1960	1959		1958		1957		1956	
	Proposed	Proposed	Jan.-Oct. Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual
Fresh and Frozen . . .	2,174	2,174	-	1,348	(US\$1,000/)	1,304	-	1,304	-
Canned	580	580	-	580	-	725	-	725	-
Fresh, Frozen, and Canned.	-	-	1,797	-	2,536	-	623	-	1,261
Fish Meal	580	290	261	188	159	43	-	43	14
Total	3,334	3,044	2,058	2,116	2,695	2,072	623	2,072	1,275

¹/Agreement became effective on July 20, 1956, and was extended through 1957-60 annually.

²/Danish kroner converted to U. S. dollars at rate of 6.9 kroner = US\$1.

erally at about the same level as in Denmark.

In Sweden fresh fish is largely customs free but on canned fish there are considerably higher duties than in Denmark. Sweden also has a special import tax on fillets of cod, whiting, and haddock, etc., of 45 Swedish ore per kilo. In Switzerland there are duties on all fish products and the incidence varies from 0.50 Swiss francs per 100 kilos to 120 Swiss francs. On the products which have special interest for Denmark such as fresh, iced, and frozen fish and fillets, the duty is 0.50 Swiss francs; on trout it is 15 Swiss francs per 100 kilos. On canned fish the duty varies from 2 to 120 Swiss francs. By negotiations with Switzerland, however, it has been agreed that the prevailing customs duties on all types of fish products except trout will be liquidated according to the rules for industrial goods under the EFTA.

In Austria there is no duty on fresh, iced, or frozen fish. There is a 20-percent duty on smoked eel and salmon. There is a 15-percent duty on fish canned in oil. On other canned fish products the duty varies considerably averaging about 540 shillings per 100 kilos.

between four Danish Trade Associations and the East German Chamber of Foreign Commerce. Similar trade agreements have been made since 1956. Fishery products make up about 21.7 percent (US\$3.3 million) of the total Danish exports to East Germany of about US\$15.4 million under the agreement. No fishery products exports by East Germany are included in the agreement. (U. S. Embassy dispatch from Copenhagen December 22, 1959.)

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FISHING INDUSTRY HAS RECORD YEAR IN 1959:

Preliminary statistics on Denmark's fishing industry for 1959 indicate a record year for total landings, exports, and investments. However, the Danish per capita consumption of fishery products remained unchanged from 1958 at about 27.6 pounds.

In 1959, landings amounted to about 1,453 million pounds, valued at 365 million kroner (US\$53 million) as compared with 1,312 million pounds, valued at 335

Denmark (Contd.):

million kroner (\$48.5 million) in 1958. The landings consisted of 1,389 million pounds of fish and crustaceans, 48.5 million pounds of mussels, and 15.4 million pounds of pond trout, increases of 125.7, 13.2, and 2.2 million pounds, respectively, over 1958.

Most of the increase was in landings of species used for reduction. The fish meal and oil plants purchased 904 million pounds as compared with 838 million pounds in 1958. These plants produced 156.5 million pounds of fish meal (145.5 million pounds in 1958), 41.9 million pounds of fish oil (37.5 million pounds in 1958), and 50.7 million pounds of fish solubles (33.1 million pounds in 1958). The fish filleting firms processed 127.9 million pounds in 1959, an increase of 10 percent over the preceding year.

Exports in 1959 increased to 562.2 million pounds from 489.3 million pounds in 1958. The exports in 1959 were valued at 419 million kroner (\$60.8 million), an increase of \$5.8 million from 1958. Export markets for fishery products were generally firm, except the fish meal and solubles, which suffered from increased competition in world markets. Exports of frozen pond trout, especially to the United States, reportedly found a better market in 1959.

Investments in the fishing industry were at an all time high due primarily to the program for replacing part of the fleet with steel cutters. The total value of the Danish fishing fleet in 1959 was 288 million kroner (\$41.8 million), up 22 percent from 1958.

During 1959, registrations of new vessels amounted to 100 and included 33 steel cutters. The steel cutters as of the end of 1959 made up 6 percent of the fishing fleets. A total of 376 million kroner (\$54.5 million) was invested in vessels and equipment in 1959. (United States Embassy report from Copenhagen, January 5, 1960.)

Note: Values converted at rate of 6,912 kroner = US\$1 in 1958 and 6,893 kroner = US\$1 in 1959.



Ecuador

JAPANESE FISHERIES RESEARCH VESSEL STUDYING MARINE RESOURCES:

The Japanese fisheries research vessel Umitaki Maru arrived in Guayaquil, Ecuador, on December 15, 1959. The vessel carries a complement of 20 officers, 45 cadets, and 26 seamen from the Fisheries University of Tokyo. The group is studying marine resources and oceanography and has proceeded from Tokyo, Honolulu, and the Galapagos Islands. The vessel reportedly will go on to Chimbote, Callao, and again visit the Galapagos prior to returning to Tokyo.

Several officials and scientists of the expedition came to Quito and paid courtesy visits to the President, the Minister of Development, and other government officials. The group is reported in the press as having expressed to the Minister of Development their views with respect to territorial waters, including those corresponding to the Galapagos Islands, as they are interested in the resources in that area. (U. S. Embassy report from Quito, December 18, 1959.)

* * * * *



Large Danish beach-landing fishing craft which are both launched and hauled ashore with the help of large electrical winches. In Denmark many fishing craft are landed direct onto beaches.

Ecuador (Contd.):

SHRIMP INDUSTRY:

Landings: Detailed statistics on the landings of shrimp in Ecuador are unavailable and estimates are based on the weight of the finished product. According to estimates by the Banco Central, Ecuador's shrimp landings (heads on, heads off, and peeled and deveined shrimp) in 1958 amounted to 2,721 metric tons, valued at about US\$4.1 million (at official rate of exchange of 15 sucres to US\$1). This compared with 2,137 tons valued at \$3.0 million in 1957 and 2,342 tons valued at \$2.5 million in 1956. It was estimated that landings for 1959 were about 25 percent higher than in 1958.

Species Composition of the Catch:

There are no accurate records of species composition. It is estimated that the landings of large shrimp are made up of about 5 percent *Penaeus vannamei* and the balance of 95 percent consists of *P. occidentalis* and *P. stylirostris*. During 1959 occasional catches were made of pink shrimp (*P. brevirostris*) off Manta and in the Gulf of Guayaquil.

Shrimp Fishing Vessels: Estimates from semiofficial sources of the number of vessels active in the shrimp fishery were 180 in 1959, 127 in 1958, 60 in 1957, and 27 in 1956. Industry sources estimated that on December 1, 1959, the vessels engaged in shrimp fishing totaled 120 to 130 instead of 180. The shrimp vessels range from 40 to 60 feet in length with Diesel engines rated between 90 and 200 hp. Most of shrimp fishing vessels have brine tanks for preserving the catch. There is one floating freezer ship which does not fish. In addition to the vessels flying the Ecuadoran flag, there were 27 foreign flag vessels operating out of Ecuador in 1956, 29 in 1957, but only 3 in 1958 and none in 1959.

The shipbuilding program has come to a stop due, it is believed, to the drop in shrimp prices in the United States market. A few of the vessels, now in various stages of construction, will be finished, but unless market conditions improve it is likely that the shrimp fleet will decrease in numbers.

Production Costs: For shrimp (headless) counting under 10 to the pound packed in 5-pound cartons, the cost f.o.b. Ecuador late in 1959 was estimated to range from 64 to 67 U. S. cents a pound. This cost is based on an ex-vessel price of 51.5 cents a pound; a cost of 8 U. S. cents a pound for grading, freezing, packing material, and loading; 2 U. S. cents a pound loss due to exchange control; and 4.5 U. S. cents a pound for export duties and port charges. Costs from the Ecuadoran port to New York City for ocean freight, insurance, unloading at port of entry, and storage charges amounted to about 6 to 7 U. S. cents a pound. Most of the shrimp is sold on consignment, and the export price would be the New York wholesale selling price less commission, storage, transportation, and unloading costs in the United States, and less ocean freight and insurance.

Ex-Vessel Prices: Prices (pack-out basis) being paid to the vessels for headless shrimp in December 1959 were as follows: white shrimp under 10 count: whites, 51.5 U. S. cents; pinks, 45.7 cents; 11-15 count: whites, 45.7 cents; pinks, 40 cents; 16 to 20 count: whites, 40 cents; pinks, 34.3 cents; 21 to 25 count: whites, 34.3 cents; pinks, 28.6 cents; 26 to 30 count: whites, 28.6 cents; pinks, 22.8 cents; 31 count and over: whites 22.8 cents; pinks, 17.1 cents. (All values based on free rate of exchange of 17.5 sucres to US\$1). Also, peeled "zebras" bring 22.8 cents a pound and peeled "titi" and "pomada" bring 17.1 cents a pound ex-vessel--the peeling is done ashore and not on the vessel.

Duties, Taxes, and Port Fees: The following duties, taxes, and port fees were in effect the latter part of 1959: export duty, 0.40 sucres per net kilogram (about 1 U. S. cent a pound); $\frac{1}{2}$ percent ad valorem for port improvement; $\frac{1}{4}$ percent ad valorem for port improvement; 1 percent on freight charges; 1 percent ad valorem on exports through Guayaquil and El Oro Province; 10 sucres per ton port fee; 1 sucre per ton statistics fee; and 0.05 sucre for each 300 pounds of shrimp for inspection and stamps. These charges total about 4.5 U. S. cents a pound. Exchange controls consist of export permits from the Central Bank, and to obtain them US\$300 in currency per metric ton of shrimp exported must be sold to the

Ecuador (Contd.):

the Central Bank at the official rate of 15.00 sucres per US\$1. Dollars earned in excess of the \$300 may be sold at the free rate which fluctuates between 17.00-18.00 sucres per US\$1. This amounts to an exchange control tax of 1.6 to 2.3 U. S. cents a pound.

Exports: Practically all exports of frozen headless and peeled and deveined shrimp are made to the United States. Exports increased from 1956 to 1959, due primarily to increased exports of small peeled and deveined shrimp ("titi" and "tigres"). According to estimates, these small peeled and deveined shrimp made up about 40 percent of the total exports in 1958 and 1959.

Table 1 - Ecuador's Shrimp Exports to United States 1956-58 and January-June 1959								
Quantity				Value ^{1/}				
1959 Jan.-June	1958	1957	1956	1959 Jan.-June	1958	1957	1956	
..... (Metric Tons) .....				..... (US\$1,000)				
1,242	12,221	1,858	1,393	659	1,465	1,758	1,234	
^{1/} Values converted at official rate of exchange 15 sucres = US\$1 for first US\$300 of value per metric ton and at the free rate of exchange (about 17.5 sucres = US\$1) for value in excess of \$300 a ton.								
Note: Nearly all shrimp exports are to United States; a very insignificant amount was shipped to Bolivia in 1958.								

Forecast: It appears probable that Ecuador's potential production of white shrimp tails is between 3 million and 5 million pounds a year. Apparently two areas have been located where pink shrimp can be caught, but only occasional catches have been made. It is suspected though, if prices were suitable, that a fairly large amount of pink shrimp could be landed in Ecuador. (U. S. Embassy report from Mexico City, December 10, 1959.)



Egypt

SHRIMP INDUSTRY
TRENDS, NOVEMBER 1959:

The only shrimp packing and freezing plant in Port Said, Egypt, was set up in November 1957. The plant, with a capacity of 20 metric tons monthly, is equipped with American refrigerating machinery. Another freezing room is

under construction and is expected to increase the plant's capacity to 40 tons a month. The authorized capital of the firm is LE6,300 (about US\$17,600).

The shrimp freezing plant is located just outside of Port Said near the railroad yards and backing on the Interior Basin. According to reports, the plant, although small, is clean and modern. About 200 employees (mostly women) sort, pack, and freeze the shrimp which are caught in Mediterranean waters near Port Said.

Practically all the frozen packaged shrimp are exported to the United States, except for small quantities exported to Italy, Switzerland, and France. No vessels are owned by the processing and freezing firm, but several vessels fish for the firm on a contract basis. (United States Consulate at Port Said, November 24, 1959.)



El Salvador

SHRIMP INDUSTRY EXPANDS:

Official statistical records maintained by El Salvador on the landings of shrimp are incomplete. The best estimates on the expansion of El Salvador's shrimp fishing industry can be obtained from United States Customs records. According to these records, shrimp exports from El Salvador to the United States began to increase in 1957 when 66,260 pounds were exported. In 1958 shrimp exports to the United States jumped to 1,130,000 pounds and during the first 11 months of 1959 totaled 1,546,000 pounds. Observers estimate that the total landings of headless shrimp in El Salvador in 1959 were about 2 million pounds with about 10-12 percent of the landings consumed locally or exported to countries other than the United States. The same sources estimate El Salvador's shrimp stocks (whites) to be between 3 and 6 million pounds (headless).

There are two plants (located in San Salvador and Triunfo) that freeze shrimp for export and a third plant is under construction at La Union. In July 1959, the

El Salvador (Contd.):

Government of El Salvador increased the limit on shrimp fishing vessels from 17 to 50 vessels. As of early November 1959, about 30 shrimp trawlers (all Diesel-powered) were operating out of El Salvador. Seven of the vessels were about 35 feet in length and the balance between 45 and 65 feet in length. Shrimp vessels arriving late in 1959 were modern United States-built trawlers fitted with double trawling rigs. Other vessels in the fleet are used vessels from countries other than the United States.

No information is available on ex-vessel prices for shrimp (all vessels are company owned). However, one new company is reported to be planning on paying about 30 U. S. cents under the United States selling price. On that basis, it was reported that the company would make a net profit of 1-2 U. S. cents a pound. Catches by the more modern vessels in late 1959 were averaging 3,000-5,000 pounds per seven-day trip. With the fleet increasing, it is expected that cost per pound will increase as the catch per vessel declines.

It is estimated that about 90 percent of the shrimp landings are made up of two species--Penaeus stylirostris and Penaeus occidentalis, with P. stylirostris the more abundant. The remaining 10 percent consists of a number of shrimp species. Most of the boats do not bring in shrimp that run over 25 count heads on.

The shrimp industry and the Government of El Salvador have committed themselves to a definite expansion of shrimp exports to the United States during 1960. (United States Embassy report from Mexico City, November 27, 1959.)



France

TUNA FREEZERSHIP TO OPERATE OFF FRENCH WEST AFRICA:

A fishing company of Saint Jean de Luz, France, has chartered the 10,480-ton Liberty ship Caen from the French

Government for a five-year period, the November 5, 1959, issue of the Danish fishery trade periodical Dansk Fiskeritidende reports. The vessel, due to begin operation in the 1960 winter tuna fishing season, will serve as a freezer-ship for tuna caught off French West Africa. The frozen tuna will be transported to France in the same ship.

The annual rental for the tuna freezer-ship will be 3.5 million francs (about US\$7,150) with an option for purchase.



German Federal Republic

ANOTHER NEW FACTORYSHIP STERN-FISHING TRAWLER COMPLETED:

A Bremerhaven shipyard has completed the new factoryship stern trawler Carl Wiederkehr for a Bremerhaven fishery cooperative. The stern trawler Heinrich Meins was built at this yard in 1956/57 for the same owners, and it is noteworthy that considerable differences exist in the design of the new ship, as compared with its predecessor. The Voith-Schneider propulsion has been abandoned, the wheelhouse and superstructure has been moved aft to about midships, and the two 750 hp. Diesels have been replaced by one of 1,650 hp. driving a controllable pitch propeller. The over-all length of the new trawler is some 4 feet greater.

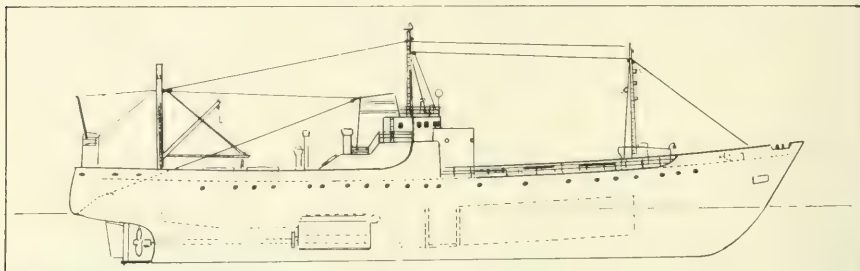
The leading particulars of the new vessel are as follows: length over-all, 220 feet 7 inches; length between perpendiculars, 189 feet; breadth moulded, 31 feet 6 inches; depth to upper deck, 23 feet 6 inches; tonnage, gross registered, 719.46; fresh fish-hold capacity, 16,529 cubic feet; deep-freeze capacity, 2,260 cubic feet; fuel oil, 30 tons; and fish meal, 55 tons.

The ship has two decks and a stern slipway, the lower deck being a free-board deck, and it is to German Lloyd Class + 100 A 4 (E). The hull structure is built of ship's steel and welded throughout, being subdivided into 6 compartments by 5 water-tight bulkheads. The

German Federal Republic (Contd.):

superstructure consists of a small shelter for the fore hatchway and air-heating system and the main control bridge and deckhouse amidships. This houses the winch compartment, hatchways, and drying room on the upper deck, with the captain's cabin and wireless cabin above.

just forward of the slipway, through a compressed air-operated hatch. On either side of this hatch are two pillars connected by a cross-member, and supporting a derrick, and this is used to lift the net so that the cod end can be emptied below, before the gear is set again. Below the fish hatch are the fish gutting and sorting pounds, between which runs a



The Carl Wiederkehr, the second factory ship stern-fishing trawler completed in West Germany--220 feet 7 inches length over-all.

The bridge itself, including the chart-room, is so arranged to give a particularly good view astern which is especially important on stern-catching vessels.

Since the ship is built with the engine half aft, the trawl winch had to be positioned forward of the funnel within the bridge structure in order to provide the required length of deck aft, and this arrangement gives good protection to the winch against wind and weather from ahead. The top of the funnel also acts as an elevated hauling point from which the cod end and heavy trawl gear is hauled on deck, and it has been suitably designed and reinforced for this purpose.

The living accommodation is designed for 8 officers and engineers and 21 crew, engine room, and galley personnel, and with reserves provides for a maximum of 31 persons. Officers have individual cabins, and members of the crew cabins for 2, 3, and 4 persons with associated messes and toilet facilities. The galley, with an electric oven and separate artificial ventilation, is built amidships beside the engine ventilation shaft together with provision rooms.

The catch is hauled on board via a stern slipway, and the cod end is emptied

conveyor belt, which first of all conveys the fish to an automatic drum-washing machine and then to a position beside the fish-room hatches in the bows, where it is automatically taken from the belt at 6 different points, and selectively passed into the various fish-room bays. On the fish-washing machine and conveyor belts use is made of "Nirosta" at all points which come into contact with the fish.

The fresh-fish room is subdivided into 12 pounds by detachable wooden transverse bulkheads, and it is insulated with glass fibre, except for the floor and a skirting one meter high where cork has been used. The fish-room floor is covered with wooden decking, and the ceiling is made of wood.

Beside the fresh-fish room, there is a small deep-freeze providing storage at -20°C . (about -18.4°F .) and intended for prime fish. The cooling system is thermostatically controlled and incorporates a center-freezing tunnel designed to accelerate cooling of the incoming fish. This room also has cork insulation on the floor and skirting, and a plant keeps the insulation permanently dehydrated.

Astern, and above the slipway, there is a gallows from which are suspended

German Federal Republic (Contd.):

the specially-designed roller-bearing gallows blocks, which can be traversed across the ship. The trawl winch has two drums holding 1,200 fathoms of trawl warp and two small drums used for hauling up the cod end in conjunction with the lifting tackles attached to the funnel.

There is also a light mast on the bridge, and another on the foredeck shelter, and these carry the radar aerial, the regulation lights, and a stay for unloading. In addition there is a smaller derrick on the after gallows and two 1-ton derricks on the gantry for handling trawl boards and other gear. Both anchor windlass and discharging winch are electric.

A comprehensive range of navigation and radio equipment is installed, as follows: magnetic projector compass, gyroscopic compass, automatic helmsman and D/F repeater; 1 echo-meter, 2 echo-sounders, 1 scale expander, radar; 1 long-distance short-wave transmitter, 350 watts, 1 medium and high-frequency transmitter, 1 medium-wave transmitter, 80 watts; 2 communication receivers; 1 Loran set; 1 V.H.F. sea-going radio with 28 channels, 1 radio receiver, and 1 intercommunication system.

The main engine is a Diesel developing a maximum of 1,650 hp. at 250 r.p.m. On the main shaft is a generator which can also function as a motor (300 hp.) enabling the 240 kw. developed by the Diesel winch-generator set to act as additional power on the propeller. Its chief function is as a shaft-driven generator, being normally used for powering the trawl winch motor, so that the winch Diesel is only for reserve use. A further 100-kw. shaft generator for the ship's mains is connected to the flywheel of the main engine by a vee belt. There is in addition, a 100-kw. Diesel generator and compressor set for ship's mains when in harbor. An oil-fired auxiliary boiler and an exhaust-gas boiler on the main engine supply the steam required for fish-meal and fish-oil plants and for heating.

The ship has a 3-bladed adjustable pitch propeller.

The electrical system operates at 220 volts d.c. with 380-volt 50-cycle 3-phase a.c. mains, fed via rotary converters and supplying those motors which are most liable to be endangered by damp, namely those in the fish-meal plant and the conveyor-belt plant, and the traverse motors on the gallows. In harbor, the rotary converters can also take a 3-phase feed from the shore and transform it into direct current. (World Fishing, December 1959.)

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STERN TRAWLERS OFFER ADVANTAGES:

A staff member of the Norwegian Directorate of Fisheries recently returned to Norway from a trip on the German stern trawler Karl Kempf, according to a report in Fiskaren (December 8, 1959), a Norwegian fishery trade periodical. He stated there was much to be said in favor of stern trawlers.

The vessel fished near Labrador and south of Newfoundland. It caught 190 metric tons of fish (mainly ocean perch) in 6½ effective fishing days. Working conditions were good on the grounds and the trip was profitable even though there were no large schools of fish.

The stern trawler is safer for the crew, can fish in bad weather, and fish are taken more quickly in that one extra drag can be made daily. Work on gear on the top deck and work on the fish on the lower deck are accomplished more rapidly and with greater freedom.

Complete operating data were obtained for the 67 drags made during the trip. Fishing occurred in 190 to 200 fathoms with 500 fathoms of wire. The average time required to haul in the trawl, to empty it, and to get it back on the bottom was only 34½ minutes.

A comparable trip will be made on a side trawler after which complete information on both types of operations will be published.

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FISHING INDUSTRY TREND IS TO LARGE TRAWLERS:

The largest West German trawlers soon will be 1,000-ton vessels, according to

German Federal Republic (Contd.):

Dansk Fiskeritidende (December 4, 1959), a Danish fishery trade periodical. Five such craft have been ordered by a group of West German fishery companies from a shipyard in Bremerhaven.

Each vessel will be 233 feet long, 34 feet in breadth, and have a fish hold with a capacity of 19,600 cubic feet. In addition, there will be an extra freezing room holding 75 metric tons of frozen fish.

For motive power the vessels will use the so-called "father and son" double motor installation with a main motor of 1,800 hp. and a smaller motor of 400 hp. The latter can drive the winch and propel the trawler alone when not coupled to the 1,800-hp. motor.

The first of the five trawlers will be ready in mid-1960. The whole series will be completed by 1961.

Vessel plans are not yet known, except that they will not be stern trawlers and will have a speed of 15 knots.

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HEAT-TREATING PROCESS FOR BACTERIA-CONTAMINATED FISH MEAL DEVELOPED:

New equipment for the sterilization of fish meal and related products infected by salmonella bacteria has been developed by two Hamburg, West Germany, firms. The new process was developed in response to the need for more effective sterilization of fish meal destined for import into West Germany. Under uniform state legislation, of which a Hamburg ordinance of February 14, 1958, forms a part, feedstuffs of animal origin may be imported into Germany only if (a) each shipment is accompanied by an official certificate (in the German language) of the country of origin to the effect that the feedstuff in question has been subjected to heat treatment or equivalent process for the killing of salmonella bacteria and (b) the feedstuff is found by health authorities at the port of entry to be free from such infestation.

The steam sterilization plant, for which German patents are pending, is designed for a continuous output of 50-300 tons per 24 hours. The meal to be disinfected is delivered to one room of the plant, from whence it is transported by conveyor belt to the hermetically-sealed sterilization chamber. From here it is passed to a packaging room in which the processed meal is put into pneumatically-sealed paper bags, in accordance with German import requirements. The possibility of reinfestation of the meal is minimized by the fact that the packaging room is completely separated from the sterilization room.

The designers of the new process state that a 150-ton capacity plant erected south of Amsterdam in the Netherlands is working satisfactorily. The cost of a plant of this size, not including boiler, is about US\$125,000. An official of the Hamburg Hygienic Institute states that, although one test has revealed no salmonella bacteria in meal which was put through the new process, 2 or 3 additional tests will be required before a final judgment can be made as to its effectiveness. (U. S. Consulate report from Hamburg November 23, 1959.)

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NEW MANEUVERABLE TRAWL TESTED SUCCESSFULLY:

Trawl fishing is facing a new revolution, according to a report in Fiskaren (December 16, 1959), a Norwegian fishery trade periodical. The West German motor trawler Rendsburg during a trial trip to the Irish Sea and the English Channel tested a pelagic trawl which, like the floating trawl, can be set in any desired position in the sea. While other trawlers caught modest quantities, the Rendsburg brought in full cod ends each of the 12 days the experiment lasted.

The experimental trip was a link in the West German ocean fishery's State-supported program for seeking new fishing grounds for its fleet of 200 large trawlers. The Rendsburg fished with various new pelagic, synthetic fiber trawls developed in cooperation with the Fishery Research Institute in Hamburg.

German Federal Republic (Contd.):

Each trawl is directed by a sounding device which has an echograph on the trawl's headrope. This makes it possible for the skipper on the bridge to check the depth of the trawl, the height of the opening, and also the fish which enter the net.

The tests showed that the advanced sounding device met all the demands placed on it. The skipper also succeeded in catching herring schools, which were in the upper layers of the sea. In the same manner, pollock, mackerel, brisling, and hake, sharks, and whiting were taken in the trawl. The new method is expected to be of importance to all pelagic fishing, including both herring and other school fish which cannot now be reached by the ordinary bottom trawl or the still uncontrollable pure floating trawl.



Greece

STERN-FISHING FACTORYSHIP TRAWLER ORDERED FROM BELGIUM:

A newly-formed Greek fishing company has ordered a stern-trawling factoryship from an Ostend, Belgium, shipyard. The new vessel of 2,000 gross tons will be 246 feet in length and draw about 19 feet. The Diesel electric drive will be powered by 2,500-hp. motors of British or Dutch manufacture. The freezing machinery and equipment of British manufacture will be able to freeze 30 metric tons of fish per 24 hours. The frozen fish storage capacity will be 600 metric tons. (Aleia, a Greek fishery trade publication, of November 1959.)



Hong Kong

FISHERIES TRENDS, JULY-SEPTEMBER 1959:

The fishermen of Hong Kong during the third quarter of 1959 were generally rewarded with good catches, which were about 30 percent higher than during the third quarter of 1958. The marketing of

fresh marine fish exceeded 3,600 tons in each of the three months. Long-line fishermen did not do as well as other types of fishermen, however, because of the strong currents they encountered on the fishing grounds.

The relaxation in August 1959 by the Chinese Communists of their restrictions on fishermen operating in the Pearl River estuary induced hundreds of fishing junks based in the Colony to venture out once again into these fishing grounds. A smaller portion of their catch needed to be surrendered, and they could purchase their necessities in Pearl River ports without as many formalities as before. Many of these junks had fled to Hong Kong originally to escape the strict Chinese Communist requirements for fishermen operating in the Pearl River.

In August 1959 the Hong Kong Government earmarked HK\$700,000 (about US\$122,500) for the acquisition of the fishery research vessel *Cape St. Mary* from the British Government. The vessel was made available for only the cost of sailing it from British Guiana to Hong Kong. The vessel will cost HK\$300,000 (about US\$52,500) a year to operate, but is expected to locate additional fishing grounds outside Colony waters that could be worked by Hong Kong's mechanized fishing vessels, which totaled 2,420 vessels on July 1, 1959. The smaller fishery research vessel *Alister Hardy*, now being used by the Fisheries Research Unit of the Hong Kong University, would be turned over to the government's Department of Agriculture, Fisheries, and Forestry for closer exploration of the inshore waters, where most of the Colony's sail-powered fishermen work. (United States Consulate dispatch from Hong Kong dated January 13, 1960.)

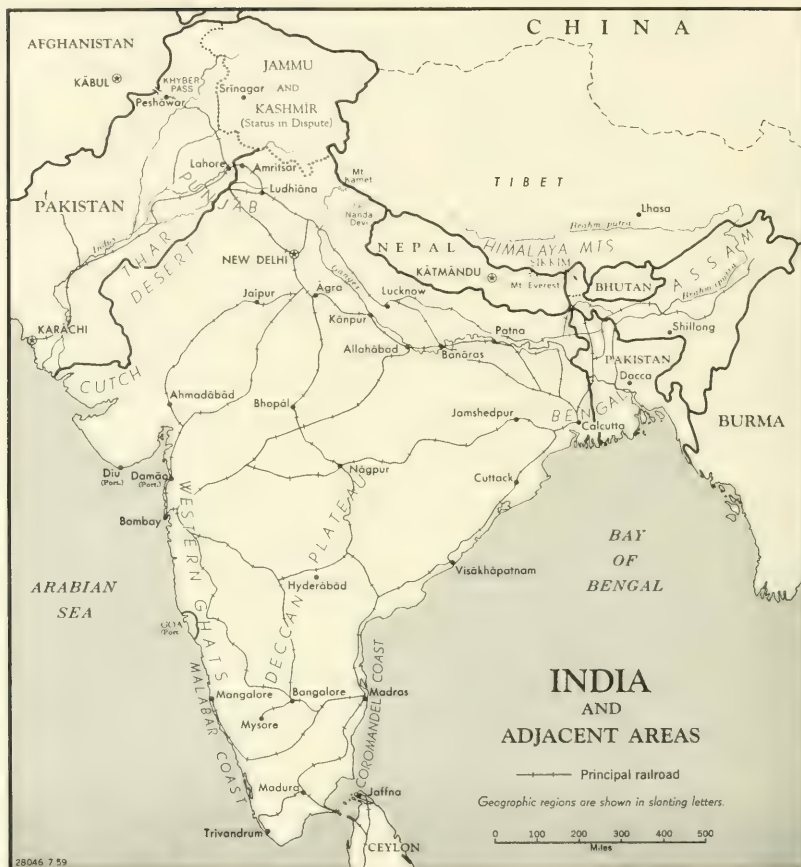


India

GOVERNMENT DELEGATION TO SEEK JAPANESE AID IN DEVELOPMENT OF DEEP-SEA FISHERIES:

A three-member Government of India delegation was expected to visit Japan in February 1960 to explore the possibilities

India (Contd.)



of obtaining Japanese aid in the development of India's deep-sea fisheries. It is believed that India's desire to seek Japanese aid in development of Indian fisheries is due to the fact that (1) Japan is active in exploiting the fisheries of the Indian Ocean and (2) deep-sea fisheries present the best opportunity for an increase in India's landings of fish. At present India's fishery production is largely from coastal and inland waters, the United States Embassy in New Delhi reported on January 12, 1960.

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RUSSIAN FRESH-WATER FISHING EXPERT TO AID FISHERIES:

A Russian expert on fresh-water fishing was scheduled to arrive in India in December 1959 to begin a 14-months assignment as a Food and Agriculture Organization (FAO) fishing-gear technologist.

The fourth Russian fisheries expert to serve in India under FAO's technical-assistance program, he will work in

India (Contd.):

cooperation with the Indian government and FAO to improve the Indian freshwater fisheries.

The Russian expert, who worked as a scientist with the Research Institute of Marine Fishery and Oceanography in Moscow until his FAO assignment, is an expert on light fishing and electrical fishing.

Electric lights are being used commercially with different methods by Russia in the Caspian, Black, and Okhotsk Seas, the Russian expert stated in an

tracted by the lights and then are suctioned up into the awaiting boats by suction pumps.

He also stated that lights had been used in the Black Sea with irregular results. This phenomenon of why a method successful in the Caspian Sea is not successful in the Black Sea is under study by Russian scientists, he said. Fishing in the Okhotsk Sea with lights was also on a semi-experimental, semi-commercial level.

The Russian predicted that the light fishing method will eventually take over a big part in the Soviet fishing industry,



Province of Assam, India. On the plains of Assam subject to flooding each year numerous bheels or ponds remain after the flood waters have receded. These bheels are often well-stocked with fish and dozens of villagers will carry out a systematic drive from one end of the bheel to another forcing the fish into a restricted space and then trapping them with inverted bamboo baskets.

interview. Russians are catching 200,000 metric tons of sprat a year in the Caspian Sea by this method alone, he said.

Under this method, a fleet of 150 to 200 fishing vessels lower lamps to different depths in the sea. Fish are at-

tracted by the lights and then are suctioned up into the awaiting boats by suction pumps.

The Russian expert said he hopes to give the Indians instruction in fishing with light if local conditions permit.

~~SECRET~~

Israel

MODERN VESSELS FOR FISHING FLEET:

Three large, modern vessels will be added to Israel's fishing fleet in 1960, according to the October 23, 1959, issue of the Jerusalem Post as reported in Fiskets Gang, a Norwegian fishery trade periodical. It is expected they will increase Israel's fish supply by thousands of tons annually. At present, about 23,000 metric tons are consumed in Israel of which 13,000 tons are taken in local waters and the balance imported.



Ein Gev, small harbor on sea of Galilee. Fishermen emptying their nets. Israel in recent years launched large vessels to harvest the resources of the Atlantic.

The first of the three vessels will be specially constructed for fishing in the Red Sea and the Persian Gulf and will join the small fleet of fishing craft which operate from a harbor well up in the Red Sea. The vessel will be able to freeze and store 100 tons of fish.

The second vessel will operate in the Atlantic Ocean and will join vessels fishing for a joint Israeli-Japanese tuna fishing company. This vessel will have freezing and storage space for 300 tons of fish. Tuna which reached the Israeli market from that company's first catch were received favorably by consumers. At present tuna and other ocean fish are reaching the market in limited quantities because the product is being held back in cold-storage warehouses to prevent a price decline. In this connection, poultry producers have exerted certain pressures on the Government since they contend that a flood of tuna on the market would adversely affect poultry prices.

The third vessel will operate off the coast of West Africa. This vessel also will have freezing equipment and, in addition, an installation for the manufacture of fish meal and dried fish.

Israel hopes that much of the increased catch will be exported to various Mediterranean countries, especially Italy and Yugoslavia. The local market is unable to absorb significantly more fish without a drastic cut in the imports of fish from the several Scandinavian countries. When such a reduction occurred a short time ago, it affected the exports from Israel to those countries. Scandinavian countries exchange their fish for Israel's oranges and citrus products, etc. Israel's Government has, furthermore, recently decided to increase imports of fish from Scandinavian countries.



Italy

IMPORT RESTRICTIONS LIFTED ON FRESH OR FROZEN FISH AND CRUSTACEANS FROM DOLLAR AREA:

Effective January 15, 1960, some 200 additional commodities may be imported freely into Italy from the dollar area. Included among the products freed from quota restrictions were fresh and frozen fish and crustaceans. As a result, Italian consumers may be able to buy United States goods whose importation has been curtailed for many years.

This action by the Italian Government will place United States exporters of competitive products on an equal basis in the Italian market with exporters of other countries. The complete list of products freed from quantitative import restrictions is not yet available. Removal of these limitations represents a further step by Italy in the direction of eliminating discriminatory and other quantitative import restrictions.



Jamaica

MANY FISHING CRAFT MECHANIZED THROUGH GOVERNMENT LOAN SCHEME:

The very effective mechanization of fishing boats promoted by the Fisheries Department of the Government of Jamaica, under which upwards of 500 outboard engines have been installed in fishing canoes, is stressed in a report issued by the Food and Agriculture Organization of the United Nations (FAO), Rome, Italy.

The report, which has been prepared by the Chief of the Fishing Boat Section, Fisheries Division, FAO, points out that the mechanization of Jamaican fishing craft has been made possible by the Jamaican Government Loan Scheme.

"The Fisheries Department of the Jamaican Government has imported outboard engines and made them available to local fishermen on very easy terms," the Chief of FAO's Fishing Boat Section stated at an interview held at the FAO Rome headquarters after his return from the West Indies. "The fisherman has only to make a first payment of 10 percent on the price of the engine and then has 18 months in which to pay the balance. Furthermore, he is able to buy ready-mixed gasoline free of duty, but an extra shilling (14 U. S. cents) per gallon is charged while the fisherman is paying for the engine."

The FAO expert has made a number of recommendations for the further development of fisheries in Jamaica, based on his observation of fishing craft, gear, equipment, methods and so on, during his visit to the island at the invitation of the Government. These recommendations include proposals for the design and construction of experimental types of fishing boats which, equipped with inboard engines, living quarters, and ice holds for storing fish, would be able to operate at more distant fishing grounds, staying at sea for several days; the introduction of new fishing methods; employing an engineer to investigate the possibilities for developing fishing ports and improving beach landing facilities for fishermen; and employing a gear

technologist to test out new fishing methods.

"For instance, little is known at present of the bottom conditions on the distant banks and in the deep waters and I think it would be a good idea to equip some of the vessels regularly plying these waters with echo-sounders, so that observations of the bottom conditions and of the presence of fish could be reported to the Fisheries Department," the FAO expert declared.

"There is a need to consider such local conditions and to experiment with various fishing methods before a suitable new type of fishing boat could reasonably be introduced," he continued. "We have, therefore, recommended that two 35-foot prototype boats should be built to test out new fishing methods and to determine whether they are of the right design from the point of view of operation, economy of running, and so on. We have also proposed that these boats could be used, along with other craft, by a master fisherman-gear technologist to carry out experimental fishing. We are now designing the boats at the request of the Jamaican Government, and have suggested that they should be built in Jamaica, preferably with the advice and assistance of a naval architect from FAO.

"If the prototype boats turn out to be an economic proposition and point the way to bigger fish landings in Jamaica," added the FAO expert, "then they may well provide an example which could be followed by the authorities in other islands in the Caribbean."

Another proposal made is that, with the introduction of larger craft and new fishing methods, a number of young intelligent fishermen should be trained to handle the boats and carry out fishing with new types of gear and equipment. The expert concerned with the training of such fishermen would, at a later date, organize training centers to spread knowledge and technological "know-how."

In the course of his report, the FAO expert commented that the designs and shapes of the present popular fishing craft, such as the dug-out canoes, are extremely good.

Jamaica (Contd.):

"They have a sharp bow and flat run and a shape which conforms with modern ideas of hull design," he pointed out. "When they are equipped with outboard motors, the canoes sail at high speed because of their good shape. A speed of 10 knots is not uncommon. Such high speed is necessary because there is no ice-storage in the small craft.

"Unfortunately it is expensive to run craft at such high speeds because it means high consumption of gasoline," he added. "I have not said this in the report but I hope that somebody one day will develop an outboard running on kerosene or Diesel oil which would cut down running expenses."

Apart from the introduction of new boats and new fishing gear, equipment, and techniques, the FAO expert has suggested that an increased catch could be made by the use of more pots per fisherman. As he points out, power-hauling of pots in deep water might increase the number of pots operated per man. There are also possibilities of extending the life of pots by using metal frames, nylon lines, and plastic floats, if tests should prove this an economic proposition.

At present, there are estimated to be some 6,500 fishermen using 2,900 craft in Jamaica. It is believed that these fishermen land something over 7,000 tons of fish annually. This falls far short of local demand for fish and some 14,000 tons of salted cod and other processed fish are imported each year, so that there is a considerable market open to the local fishermen if they can increase their catch.



Japan

ATLANTIC TUNA EXPORTS
TOP 50,000 TONS:

The Japanese Export Tuna Freezers' Association has recently issued data on actual and planned direct exports of fresh and frozen (mostly frozen) tuna

from the Atlantic for the present export year (April 1959 through March 1960)--a total of 182 trips with 50,763 metric tons of tuna.

Japanese Direct Exports of Fresh and Frozen Atlantic Tuna		
Destination	Number of Trips	Quantity Landed
United States (transshipments):		Short Tons
California	24	8,288
Oregon	3	489
East Coast	16	3,624
Ponce, Puerto Rico	5	1,251
Undetermined	2	1,100
Total shipped to U. S.	50	14,752
Direct landings in:		Metric Tons
Italy	39	11,070
Yugoslavia	39	12,545
France	20	6,341
Europe, undetermined	6	2,526
Africa	23	4,199
South America and other	5	691
Total other than U. S.	132	37,372
1/Metric equivalent about 13,391 tons.		

Initial plans for this export year called for 120 trips for transshipment to the United States, but the plan has been cut-back to 50 trips. (Suisan Tsushin, December 24, 1959.)

EXPLORATORY TUNA FISHING
IN CARIBBEAN SEA:

In December 1959, information on exploratory tuna fishing operations by the Japanese Fisheries Agency's research vessel *Shoyo Maru* (600 tons) in the Caribbean Sea was released.

The vessel fished six times in six days and obtained average catches of 3 tons a day. Catches comprised yellowfin, albacore, big-eyed, and species of swordfish. The ship used 200 baskets of long line for each setting.

After completing exploratory fishing operations, the vessel was expected to visit Ponce, Puerto Rico, then proceed to Samoa, via the Panama Canal. After exploring fishing grounds between New Zealand and Australia, the vessel was scheduled to return to Japan in March 1960. (Fisheries Economic News, December 24, 1959.)

Japan (Contd.):

FROZEN TUNA EXPORTS, 1959:

The Ministry of International Trade and Industry has revealed Japan's 1959 frozen tuna exports (including transshipments to the United States from an intermediate port and direct landings in foreign countries) amounted to about 152,000 metric tons.

Exports by country of destination were: American Samoa 12,000 tons, New Hebrides 3,000 tons, Italy 12,000 tons, France and Dakar 10,000 tons, Yugoslavia 10,000 tons, Argentina 500 tons, the United States 100,000 tons (albacore 30,000 tons and yellowfin 70,000 tons), and other countries 4,500 tons.

Exports of yellowfin tuna were heavy in 1959 as compared with the previous year. Also exports to Yugoslavia were considerably greater.

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EXPORT QUOTA FOR FROZEN ALBACORE MAY NOT BE MET:

The Japan Frozen Food Exporters' Association has opened the frozen albacore tuna export quota for the period January-March 1960, and the quota for the export year is to be 30,000 tons, as originally planned. In opposition to the common-sense opinion that the 30,000-ton goal cannot possibly be attained because of the poor summer albacore catch, the opinion is heard in some quarters that the quota can be filled by a heavy production of long-line albacore frozen aboard the fishing vessels, without dependence on pole-and-line albacore tuna catches.

According to this way of thinking, the number of tuna long-liners, which was 140 in 1958, rose to 190 in 1959, and there has been about a 30 percent increase in the number of boats fishing the Indian Ocean albacore grounds. Catch rates have also risen, and it is held that exports of 15,000 tons are possible in the period from December 1959 to March 1960, as compared with 11,200 tons in the same period last year. Actual exports up to December 1959 were about 13,000 tons, and if transshipments from the Atlantic and exports of loins made

from the winter albacore catch are taken into the calculation, it is claimed that the 30,000-ton quota can definitely be filled. If this is so, then the evaluation of the albacore pole-and-line fishery that has prevailed hitherto will change markedly, and with the desire for increased production of canned albacore, it is conceivable that the near future may see a rational division of the catch, with bait-boat fish being taken by the cannery and with long-line fish going to the freezers.

Many persons, however, estimate that frozen albacore exports for the export year will end up at about 25,000 tons, figuring that the 30,000-ton quota cannot be filled with long-line frozen fish (including mothership fish) unless monthly landings for the next three months average 4,000-5,000 tons, while it is generally estimated that they will be at most about 60 percent of that.

In any case, it is a fact that the relative importance of shipboard-frozen fish in frozen albacore exports has increased greatly since 1958, and if the poor summer albacore fishing continues another year, there is no room for doubt that long-line frozen albacore will come to occupy a predominant position. (Nikkan Suisan Tsushin, December 21, 1959.)

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FROZEN ALBACORE TUNA EXPORT QUOTA FOR JANUARY-MARCH 1960 ESTABLISHED:

As a result of discussions at a meeting of the Steering Committee of the Japanese Export Frozen Tuna Fisheries Association, 6,000 short tons was established as the quota for frozen albacore tuna for the period January-March 1960.

Shipments of frozen albacore increased since December 1, 1959, and as of December 15 amounted to some 2,800 tons. At and around the end of each year, landings become heavy. A number of tuna vessels were expected to be back from the Indian and Atlantic Oceans with a total of about 5,000-6,000 tons by the end of 1959, and it is natural to expect that exports too will increase. For exports to the United States, prices are quoted

Japan (Contd.):

as \$310-320 per short ton f.o.b. (Fisheries Economic News, December 23, 1959.)

PROSPECTS FOR WINTER ALBACORE TUNA FISHERY POOR:

Northeastern Japan cannerys were helped financially in 1959 with the skipjack tuna season, but lost money on summer albacore tuna and saury. During the late fall of 1959, they were pinning their hopes on the winter albacore fishery, but judging from the catches up to December, good catches cannot be expected, and it is predicted that high prices will prevail because of a scarcity of fish. Two vessels from Kesennuma were fishing in early December, along with 3 or 4 Mie Prefecture vessels, but the grounds off Choshi and the more southerly grounds were showing signs of poor fishing, and it is expected that the tuna cannerys will suffer from high prices due to a scarcity of raw material.



Cormorant fishing on the River Nagara

Each year the winter albacore season extends from late November to March, but in 1959 the Mie Prefecture fleet was late in going fishing, as were the Yaizu, Shimizu, Izu, and Miyagi fleets, and it looked as if it would be the middle of December before all would be active. At the end of November, a 140-gross-ton vessel and a 169-gross-ton vessel from Kesennuma sailed to find albacore, and depending on their results, 3 or 4 more vessels were due to sail. As of December 15, 35 vessels from Mie

Prefecture, 20 vessels from Shizuoka Prefecture, and 15 vessels from Miyagi Prefecture were expected to be live-bait fishing for albacore. The fishing grounds 700 to 800 miles east of Choshi, which produce winter albacore in normal years, were not yielding the expected catches, and fish were also scarce in the Midway area, on which the larger vessels had been placing their hopes.

In the face of these pessimistic indications, the cannerys appear to have nearly given up their hope of making up for the poor summer albacore catch by means of the winter fishery. At the port of Kesennuma this year, the price of summer albacore was US\$328 to \$354 per short ton, and the cannerys, whose break-even point is said to be \$275 a ton, lost \$76 per ton on their raw material cost. Adding the cost of labor, packing, and storage, raw fish bought at \$313 a short ton meant a loss of \$1.95 to \$2.25 a case, it is said.

According to reports reaching Japanese canning circles, the U. S. albacore fishery took about 30 percent more fish in 1959 as compared with 1958 and American fishermen reduced their price. This situation in the United States has been reflected in a weakening of demand from the American market. In any case, export albacore canning cannot help losing money on both the summer and winter albacore fisheries. Furthermore, because of the three years of poor albacore catches in succession, vessel owners are changing their ideas about albacore pole-and-line fishing, and it looks as if the winter albacore fishery, as an off-season employment for skipjack vessels, may be at a turning point. (Nippon Suisan Shimbun, December 9, 1959.)

WINTER ALBACORE TUNA FISHERY TRENDS, DECEMBER 1959:

Because mackerel-pike fishing continued good at a remunerative price in December 1959, the shifting of Japanese fishing vessels to winter albacore fishing was delayed. Also, vessels from Shizuoka Prefecture, with the exception of a few, which ordinarily play an important part in the winter albacore fish-

Japan (Contd.):

ery were preparing to sail for the more stabilized yellowfin fishing areas in the South Pacific. Albacore fishing vessels actively fishing in the 1959/60 winter were expected to be less than the number that fished a year ago.

A large California canner was reported actively buying frozen albacore in December 1959. The Japanese export market has maintained a strong tone and climbed to \$310 from \$290 a short ton f.o.b.

Some of Japanese tuna vessels were returning from the Indian Ocean in December with a fairly good quantity of albacore tuna. The mentioned packer is reported to have purchased about half of those landings--2,500-3,000 short tons. (Excerpts from several news stories in Japanese Press.)

As of mid-December a total of 20 tuna vessels were fishing albacore tuna near Madagascar in the Indian Ocean--10 from Misaki and Tokyo, 5 each from Shizuoka and Mie Prefectures. The average daily catch by each vessel was 4-5 metric tons. The size of the fish caught was getting larger. These vessels were expected to be back in Japanese ports in February.

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WINTER ALBACORE TUNA PROSPECTS IMPROVE BUT PRICES STILL HIGH:

Although it was reported that this winter's Japanese live-bait albacore tuna fishing around 27° N., east of 160° E. was very poor, considerable hope was held for the long-line fishing around 30° N. It was expected that landings from that area would increase after mid-January.

The trends for this season are: (1) the bait-boat albacore which usually start landing around December 20 did not show up at all, and although about 20 boats from Mie and Shizuoka Prefectures were on the grounds, there was no report of their catching fish; (2) on the other hand, the albacore long-lining south of the Kii Peninsula, which usually begins

to produce catches in January, began producing landings in the last 10 days of November 1959, and through December an average of 20 tons a day was landed at Katsuura and Yaizu.

The boats from northeastern Japan, which do the greater part of the winter bait fishing, were slow in shifting from saury fishing, and were not expected to be in full operation until the end of December 1959. Boats from Kagoshima, Tosa, and Wakayama, which usually enter the albacore long-line fishery after the latter part of January, were reported to have stopped yellowfin tuna fishing on southern grounds and to be planning to enter the albacore fishery earlier this year. According to the Tokai University Fisheries Laboratory, prospects are poor for the albacore bait-boat fishing off northeastern Japan.

The fish landed by long-liners in December 1959 were large--40 to 55 pounds each--and their quality was good, so that they were suitable for Japanese canners. The ex-vessel price was 125 to 135 yen per kilogram (US\$316 to \$339 per short ton). With the export price at US\$310 to \$320 f.o.b. Japan, the freezers could not buy fish at prevailing ex-vessel prices.

Because the Japanese canners were disappointed in the skipjack tuna catch off northeastern Japan in the autumn of 1959, they were looking to the winter albacore fishery to supply them with raw material after they finished tangerine packing. It was reported that they were already stocking up on long-line albacore and frozen clipper fish, so informed sources believe that the albacore ex-vessel price will hold up even if the winter long-line fishery has good catches. (Suisan Tsushin, December 23, 1959.)

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TUNA FISHERY TRENDS, 1959:

The Japanese 1959 summer albacore tuna season (which was also very poor in 1958) ended with an unprecedentedly low catch, causing considerable concern to Japanese tuna fishery interests. This fishery, which is carried on from April to July, would in ordinary years produce landings of about 40,000 metric tons at

Japan (Contd.):

its most important base of Yaizu, but in 1958 only half that amount was landed, and in the summer of 1959 only about 10,000 tons were landed. Because of the poor fishing prospects, ex-vessel prices rose steeply the latter half of the season and reached 160 yen a kilogram (US\$405 a short ton).

In spite of the high prices, most of the combination bait-boat long-liners made little money. Most of the vessels gave up albacore fishing early and switched to the skipjack tuna fishery. The unreliability of albacore fishing resulted in a decline in the number of vessels operating in that fishery. This meant there was insufficient scouting of the offshore grounds and the schools were not located.

A large number of tuna long-liners moved to the Atlantic grounds. In recent years all fishing grounds of the Indian Ocean and the Pacific have been thoroughly exploited, catch rates are trending steadily downward, and operating costs are steadily rising. The vessels operating in the Atlantic engage in direct exporting and their operating costs are reduced. Late in 1959 a number of vessels from Shimizu and Yaizu went to the Atlantic.

In 1959 there was a tremendous growth of the fish-sausage market in Japan. Since tuna is used in that product, it has added another level of demand for tuna and has contributed importantly to the stabilization of the tuna fishery. It is hoped that similar new uses for skipjack tuna can be found in order to stabilize the price of that fish, which has fluctuated considerably because it is used largely for the traditional dried skipjack products. (Suisan Keizai, December 27, 1959.)

PROPORTION OF ALBACORE IN ATLANTIC TUNA CATCHES CLIMBS SHARPLY:

Japanese Atlantic tuna fishing operations have from the beginning produced mainly yellowfin tuna, but the latter part of 1959 a sharp increase in the propor-

tion of albacore in the landings has attracted attention. One vessel with a catch of 200 tons in December had 90 percent albacore, and another which landed 350 tons had 70 percent albacore. (Suisan Tsushin, December 28, 1959.)

RESEARCH VESSEL TO EXPLORE TUNA RESOURCES OFF WEST AFRICA:

The Japanese Fisheries Agency's research vessel Shoyo Maru (604 tons gross) this year will explore the tuna resources off the Dakar and Gold Coast areas of West Africa. The vessel has finished her explorations in the Caribbean sea and was expected to return to Japan in March 1960, exploring tuna resources in the South Pacific and around Australia en route. Upon her return, she was expected to go into drydock for overhaul and will begin her next long cruise in August 1960.

The budget for the Shoyo Maru's operations off West Africa has already been determined, and will finance 87 days of explorations. She will survey an area off the Gold Coast between 10° N. and 10° S., 5° E. to 30° W. and other West African areas at 15° N. to 25° N., 20° W. to 40° W. In each of these areas 25 long-line stations will be fished.

In addition to exploring the fishing grounds, the Shoyo Maru will determine market conditions and advertising possibilities for consumption of tuna products in France, Italy, Yugoslavia, and Egypt. Her schedule calls for departing Tokyo August 1, proceeding via Colombo to Capetown (September 11), to the Gold Coast area and Dakar (October 20), to other West African areas, and thence to Marseilles (November 11), Venice, Rijeka, Port Said, Suez, Singapore, and back to Tokyo (January 19, 1961). (Suisan Keizai, December 27, 1959.)

TUNA VESSELS FISHING IN CAROLINE-MARSHALL ISLANDS AREA:

About 45 small Japanese vessels were fishing for tuna in the South Pacific around the Caroline and Marshall Islands in mid-December 1959, according to an

Japan (Contd.):

announcement by the Fisheries Research Institute, Tokai University. Catches were made up of small or medium size yellowfin tuna. The actual fishing area was around Palau. A belt of water with temperatures of 28.7° - 29.2° C. (83.7° - 84.6° F.) was formed around Truk and Ponape and fishing became more intense there. Also along the east coast of Australia in the Coral Sea, good fishing was reported with yellowfin, big-eyed, and white marlin mixed in catches. Likewise, yellowfin and big-eyed fishing east of 125° west longitude, south of 5° south latitude was noticeably improving at that time. (Fisheries Economic News, December 12, 1959.)

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RULES FOR LICENSING CANNED TUNA EXPORTS TO THE U. S.

The Japanese Ministry of International Trade and Industry announced these rules for licensing canned tuna exports to the United States during January-November 30, 1960.

(1) Canned tuna exported to the United States is limited to tuna in brine, tuna spreads, and animal foods.

(2) The quantity to be licensed for export will be in proportion to actual records of canned tuna (in brine, in oil) exported to the United States, January 1, 1950-December 31, 1955.

(3) The quantity will be converted to the equivalent of tuna No. 2 cans (7 oz., 4 doz. to case). Can sizes other than No. 2 will be converted as follows: Tuna No. 1 cans, 2 doz. to case=0.94; tuna No. 3 cans, 4 doz. to a case=0.48; tuna 2 kilo (4.4-lb.) cans, half dozen to case=1.16.

Destinations: 50 states of the United States, District of Columbia, Puerto Rico, Virgin Islands, Panama Canal Zone, Guam, American Samoa, Wake, Midway, Canton Island, and Enderbury Island. (Fisheries Economic News, December 7, 1959.)

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TUNA INDUSTRY PLANNING SKIPJACK FISHING OFF BRITISH NORTH BORNEO:

A large Japanese company has revealed a plan to establish a tuna-fishing base on Shamil Island, about 60 miles east of Tawao in British North Borneo. This project is said to have originated from the mission of Japanese fisheries, mining, paper, and oil men to North Borneo in May 1959. The Japanese company has, since May, been in touch with the local authorities in North Borneo, who are said to be actively favoring the project. Officials of the company's export and canning departments were expected to go to North Borneo to conduct final negotiations.

As reported in Tokyo, the plan calls for establishing a cannery capable of producing 500 cases of canned tuna a day together with cold-storage facilities. Five 40-ton live-bait tuna vessels are to be sent to the base initially, and a production of 8,000 to 10,000 metric tons of skipjack tuna a year is envisioned. The business will be carried on by a Japanese corporation, the product will be almost entirely exported to the United Kingdom and the United States, and the local Government will derive benefit from the operation through export duties.

Waters off Shamil Island are known to the Japanese tuna industry as rich year-round skipjack grounds from experience before World War II, when there was a small Japanese tuna fishing base there. (United States Embassy, Tokyo, December 11, 1959.)

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FISHERY LANDINGS HIGHER FOR FIRST HALF OF 1959:

The Japanese Ministry of Agriculture and Forestry in its January-June 1959 report showed total landings for Japan-based fisheries of 2,120,000 metric tons, a 3-percent increase over the corresponding period of 1958 and the highest of the past seven years. Major species showing important increases were mackerel scad (46 percent), Alaska pollock (23 percent), skipjack tuna (54 percent), bluefin tuna (100 percent), and common squid, which hit a new high of 44,144 tons, about 1.8 times the January-June 1958 landings. On the other hand, there was a decline in production of sardines (13 percent), anchovy (22 percent), Atka mackerel (40 percent), and sand lance (34 percent). Albacore landings were 25,276 tons or 26 percent below the first six months of 1958 poor landings, because of the failure of the summer live-bait fishery. The skipjack tuna catch of 85,450 tons represented a further increase over

Japan (Contd.):

the January-June 1958 unusually large landings of that species and set a new record. Japan-based landings of yellowfin tuna were down 3 percent to 41,496 tons, the second year of decline after five years of steady increase, reflecting the shift of many large tuna boats to the Atlantic, where they land or transship their catches in or to foreign ports.

Despite the poor early summer albacore catch, the live-bait tuna fishery's over-all catch for January-June 1959 of 97,285 tons was up 11 percent as compared with the same period of 1958. Total landings from the tuna long-line fishery were 155,670 tons, 12 percent above January-June 1958 and more than double the 1953 production. The spring herring fishery in Hokkaido, which has been declining rapidly in recent years, was an almost total failure, and herring production for the period was only 15,268 tons. As a consequence, dried herring rose, a traditional Japanese New Year's dish, was selling at the unheard-of price of 590 yen (about US\$1.40) per 100 grams (about 0.22 lbs.).

There was not much general change in fish prices during the first half of 1959. The over-all average price for all species in the wholesale markets of the six largest cities was up about 4 percent to 11 U. S. cents a pound, while the corresponding average price in the markets of 83 producing areas was down about 3 percent to 6 U. S. cents a pound. Prices for herring, anchovy, and saury rose; sardine and round herring held steady; and mackerel scad and mackerel were lower than in 1958. Among the tuna species, skipjack at 6.5 U. S. cents a pound (\$30 a short ton) was down 22 percent, bluefin at 26.6 U. S. cents a pound (\$532 a short ton) was up 11 percent, albacore at 13.7 U. S. cents a pound (\$270 a short ton) was up 14 percent and yellowfin at 11.7 U. S. cents a pound (\$234 a short ton) was 11 percent higher than in 1958. Fresh and salted salmon prices were up by 22-36 percent, shrimp was up 8 percent, oysters were up 14 percent, and pelidum seaweeds, the raw material for agar-agar, were 42 percent higher than during the first six months of 1958.

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STERN TRAWLERS PLANNED FOR FISHING OFF AFRICA AND AUSTRALIA:

The Shimonoseki Branch of a large Japanese fishing company has announced that as part of its 1960 operating plans it will build two 1,500-ton stern trawlers and will enter upon the development of new fishing grounds off Africa and Australia. Two other large fishing companies have also been announcing various plans for the construction of large trawlers for fishing in new distant areas. This is the result of crowding on the grounds of the East China Sea and restrictions in the North Pacific salmon fishery. Since the company building the two large stern trawlers has been heavily engaged in North Pacific salmon fishery, restrictions in that fishery have had an adverse effect on its operations.

The company is expected to ask the Japanese Fisheries Agency for permits to build these two stern trawlers early this year. Construction will cost about 600 million yen (US\$1,680,000); the trawlers will be started in March, launched

in May, and completed in June. (Suisan Keizai, December 27, 1959.)

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NEW FISH-MEAL FACTORYSHIP FOR BERING SEA:

The fish-meal factoryship Soyo Maru (10,900 tons gross), which a Japanese fishing company has under construction at Sasebo, Japan, was scheduled to be launched on January 15 and completed by mid-March. With the construction of this ship, there will be four fish-meal factoryships operating in the Bering Sea in 1960--Kinyo Maru, Renshin Maru, Soyo Maru, and Gyokuei Maru. (Suisan Tsushin, December 26, 1959.)

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FACTORYSHIP DUE TO BEGIN EXPERIMENTAL OPERATIONS FOR PACIFIC HERRING IN APRIL:

A Japanese factoryship herring fishery will be started in April 1960 in the North Pacific. The industry is laying plans to carry out a Bering Sea-Bristol Bay experimental herring fishing operation on a small scale when the fish meal factoryships begin fishing in April. The plan is to send out 2 or 3 herring fishing boats with the four fish-meal fleets scheduled for operation in 1960 and carry on herring fishing in addition to the usual fishery for bottom species for reduction into fish meal.

The Japanese have not fished for the Bristol Bay herring in the 14 years since the war and the fishery is at present an unknown quantity. Therefore, although it is known that herring occur there, nothing is known of their abundance. For this reason, the companies will carry on experimental operations in connection with the fish-meal fleets, rather than organize special herring fleets, and depending on the results of the experimental fishing, this fishery may take a place as the third northern Pacific fishery. (Suisan Keizai, December 18, 1959.)

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FROZEN CUTTLEFISH EXPORTS TO ITALY:

Five firms in Hokkaido, Japan, are reported to have succeeded in concluding

Japan (Contd.):

an agreement to export 500 metric tons of frozen cuttlefish worth about US\$83,333 to Italy. The first shipment was expected to be made early in 1960. Frozen cuttlefish will be used for bait in Italy. (Fisheries Economic News, December 17, 1960.)

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SHRIMP INDUSTRY:

Japan has produced in recent years from 47,000 to 55,000 metric tons of shrimp annually, of which about 5 percent has been exported. The shrimp landings comprise many species and represent for the most part incidental catches from a variety of fisheries. There does not seem to be any possibility of a great increase in production and export of shrimp from the domestic fisheries.

Shrimp Fishery: Although more than a dozen species of shrimp are caught by Japanese fishermen, the only distinction made in the statistics of the Ministry of Agriculture and Forestry is between the "kuruma" shrimp, *Penaeus japonicus*, and "other shrimp." Shrimp is an important incidental catch in a variety of Japanese trawl fisheries, but there is no fishery of any importance primarily devoted to catching shrimp. Shrimp landings are reported from all of the coastal Prefectures of Japan and are recorded in the catches of 16 different types of fishing gear, all of which also take other kinds of fish. For example, the East China Sea trawl fishery is an important producer of large shrimp, the "taisho-ebi" (*Penaeus orientalis*), but even during the peak winter season only 30-40 percent of its catch is shrimp.

Table 1 - Japanese Shrimp Landings and Value, 1956-58 and First Eight Months of 1959-59

Year	"Kuruma" Shrimp		Other Shrimp	
	Metric Tons	US\$ 1,000	Metric Tons	US\$ 1,000
Jan.-Aug. 1959	1,516	1/	38,696	1/
Jan.-Aug. 1958	1,492	1/	30,343	1/
1958	2,784	5,502	52,679	21,526
1957	2,051	3,820	45,427	19,699
1956	2,306	4,281	47,917	18,381

1/Value unavailable.

Shrimp are produced by a variety of trawl fisheries, employing vessels of many types and sizes, from less than 5 tons to over 100 tons gross. The number of powered vessels in the classes that can be regarded as potential shrimp producers is more than 36,000. Nearly half of the Japanese shrimp catch is, however, taken by vessels of the category called "small powered trawlers etc." There are approximately 11,500 vessels in this category in the Inland Sea region, which accounts for about 40 percent of Japan's total shrimp catch. Nearly all of these vessels are smaller than 5 tons gross, and about 8,000 of them are under 3 tons.

Recent Japanese statistics show no trend of marked increase or decrease in the number of vessels in any of these categories of trawlers which catch shrimp in Japan, nor are there any organized plans for constructing or decommissioning important numbers of such vessels.

Prices: According to a Japanese Fisheries Agency source, it costs about 8,000 yen (US\$22.40) per ton to freeze shrimp. Refrigerated storage charges run around 9.8 yen (2.7 U.S. cents) per 10 kilograms (22 lbs.) for 15 days at -10°C. (-14°F.) and 30 percent more at -20°C. (-4°F.). This is said to be an average charge, but cold storage charges vary greatly depending on demand.

A large number of species and sizes are landed and several species are regularly marketed both alive and dead, with the live shrimp commanding a premium price.

As with other fish and shellfish landed in Japan, sales are by bid and the prices vary considerably from day to day and also between various lots offered on the same day.

The average price of large "kuruma" shrimp in the Tokyo market in July 1959 was 62 U.S. cents a pound (headless). January 1960 wholesale prices at the Osaka market for this species were about 350-600 yen per kilogram (44-75 U.S. cents a pound), but the Tokyo price is running about 95 U.S. cents a pound for headless shrimp. According to monthly average price data for the past two years, the price of this shrimp in mid-winter is generally about two or three times the mid-summer price.

January 1960 prices for the "kuma-ebi" (*Penaeus monodon*), another large species of shrimp, at Tokyo and Osaka wholesale markets were approximately the same as for the "kuruma." Other wholesale prices were 70 to 90 U.S. cents a pound for the "shiba-ebi" (*Metapenaeus joyneri*), 23 to 38 U.S. cents a pound for white shrimp (*Pasiphaea siradog*), and 8 to 16 U.S. cents a pound for red shrimp (*Penaeopsis akayebi*).

Catches in the East China Sea and Yellow Sea 1959/60 winter fishery for "taisho-ebi" are so far only about 10 percent of the 1958/59 winter's catch, and the ex-vessel price was averaging 68 U.S. cents a pound. At this price level, it is said that all of the shrimp is sold on the domestic market, and these shrimp cannot be profitably exported until the price drops to about 50 U.S. cents a pound (headless), according to trade sources.

In 1958 the average prices for the year in the markets of the producing areas were 91 U.S. cents for "kuruma" shrimp and 19 U.S. cents a pound for other kinds of shrimp. Corresponding prices for the wholesale markets of the six largest cities were 95 U.S. cents and 47 U.S. cents a pound.

On December 8, 1959, the first deliveries of the season of "taisho-ebi" to the Tokyo central market sold at 83 U.S. cents a pound for large (6 to the pound) and 51 U.S. cents for small (11 to the pound) shrimp.

Shrimp Exports: According to the Japan Frozen Food Exporters' Association, average export prices in October 1959 were US\$1,440 a short ton for "taisho-ebi", US\$1,300 for "prawns," US\$1,288 for "shrimp," and US\$1,116 for cooked and peeled shrimp. These prices are very close to the respective averages for these categories for the period April to October 1959, and prices have reportedly not changed greatly since October 1959. According to the Ministry of International Trade and Industry, the over-all average frozen shrimp export price for the period from January-October 1959 was US\$1,393 a short ton, as compared with US\$1,251 for the same period of 1958.

Table 2 - Japanese Exports^{1/} of Frozen Shrimp by Country of Destination, 1956-58

Country of Destination	1958		1957		1956	
	1,000 Lbs.	US\$ 1,000	1,000 Lbs.	US\$ 1,000	1,000 Lbs.	US\$ 1,000
United States . .	2,660	1,679	2,492	1,551	2,336	1,381
Hawaii	22	19	34	27	28	18
Ryukyu	48	42	36	31	36	18
Hong Kong	-	-	2	2/	10	2
Canada	14	4	44	24	2	2/
United Kingdom . .	608	378	-	-	-	-
Australia	108	61	-	-	-	-
Other	24	21	22	13	-	-
Total	3,484	2,204	2,630	1,646	2,412	1,419

1/Total exports for Jan.-Oct. 1959 amounted to 6,438,000 lbs., valued at US\$4,455,560.

2/Value less than \$500.

Japanese exports of dried shrimp have declined in recent years, canned shrimp exports show no particular trend, but exports of frozen shrimp, after rising gradually from 1956 to 1958, appear to have increased considerably in 1959. This may reflect the good catch of "taisho-ebi" in the East China and Yellow Seas in the winter of 1958/59, and if this is the

Japan (Contd.):

Table 3 - Japanese Exports^{1/} of Dried Shrimp by Country of Destination, 1956-58

Country of Destination	1958		1957		1956	
	1,000 Lbs.	US\$ 1,000	1,000 Lbs.	US\$ 1,000	1,000 Lbs.	US\$ 1,000
United States . . .	78	47	78	51	88	55
Hawaii	157	98	113	77	132	80
Ryukyus	4	1	5	1	16	5
Hong Kong	44	11	82	18	100	31
Taiwan	571	164	614	185	639	187
Other	55	33	23	10	36	18
Total	908	354	915	342	1,011	376

^{1/}Total exports for Jan.-Oct. 1959 amounted to 716,000 lbs., valued at US\$272,370.

case, exports may decline again if the poor catches of the early part of the 1959/60 season continue. At any rate, it appears that despite the strong domestic demand for shrimp in Japan, there is a considerable quantity available for export when market conditions are favorable.

Summary: Shrimp production from Japan-based fisheries has increased in recent years, but the increase has not been spectacular. There are probably no important shrimp resources in areas accessible to Japanese-based vessels that are not already under intensive exploitation, and therefore no great increase in the landings is anticipated. The most likely way in which the large Japanese trawling fleet could contribute to an important increase in the world's supply of shrimp would be for some of the Japanese fishing industry's plans for foreign-based operations--in such areas as the Mexican west coast, the Bay of Bengal, or Venezuela--to materialize.

An interesting plan for the large-scale culture of the large shrimp (*Penaeus japonicus*) in abandoned salt beds of the Inland Sea is scheduled to be put into operation in 1960, under the technical direction of the former research chief of the Japanese Fisheries Agency. It is claimed that an economically feasible method has been perfected for raising "kuruma" shrimp from the egg to marketable size, and the promoters reportedly plan obtaining an annual production of 3,000 tons at the end of three years and of 10,000 tons after the project has been under way for five years. A large part of this production is intended for export. (United States Embassy report from Tokyo dated January 11, 1960.)

FISH-CULTURE COMPANY TO RAISE SHRIMP:

A Japanese fish-culture company, jointly financed by two large Japanese fishing companies, is expected to begin operations in April 1960 to raise "kuru-maebi" (a species of shrimp), with a former Fisheries Agency director as its president. The company expects to produce about 240 metric tons in about half a year from a brood stock of about 24 tons of shrimp. The shrimp are for domestic consumption and for export to the United States. (Suisan Tsushin, December 15, 1959.)

SHRIMP FISHING VESSELS SOLD TO MEXICO:

Two Japanese shrimp fishing vessels, the No. 8 Hajime Maru (110 tons gross) and the No. 16 Myojin Maru (160 tons gross) departed Japan for Mexico in mid-November 1959. They sailed from Hawaii on December 23 and were scheduled to reach Acapulco in mid-January for delivery to a Mexican firm under the supervision of a Japanese trading firm. A Japanese fishing firm was asked by two Japanese trading companies to procure the two vessels and sail them to Mexico.

The initial arrangement was a sales contract for the two shrimp vessels, and the terms of the contract would be fulfilled with delivery of the vessels in Mexico. However, the Japanese fishing company that sailed the vessels has been asked by a Japanese businessman and the Bank of Tokyo to take this opportunity to enter into an operating agreement with Mexicans, and about January 10 the Director of the Japanese fishing company was expected to go to Mexico. Depending on the results of his investigations, the Japanese fishing company is said to be inclined to undertake the operating agreement (Suisan Tsushin, December 24, 1959).

PET FOODS MADE OF FISH EXPORTED TO UNITED STATES:

Japanese exports of pet foods (made mostly with tuna) to the United States were up sharply in 1959. As of November 30, 1959, exports amounted to more than 400,000 cases, far in excess of the 200,000 cases shipped in 1958.

The price towards the end of the year was about \$5.00 a case f.o.b. Japan. Exporters in Japan indicate that sales contracts will double again in 1960. (Fisheries Economic News, December 19, 1959.)

TRAWLERS FISHING IN NEW AREAS:

Because of difficulties and restrictions on trawling west of 130° east longitude, the Japanese trawler industry is seeking new trawling areas.

Japan (Contd.):

Trawling west of 130° is a fishery centered around the East China Sea west of 135° east longitude, but it is under an unstabilized operational condition, affected by relations with Red China. The catch by large trawlers is steadily declining in the area, i.e., the catch of 17,600 tons in 1958 was 2 percent less than the previous year and 45 percent less than in 1953.

Under the circumstances, one of the large Japanese fishing companies withdrew its large trawlers from the South China Sea and west of 130° east longitude and sent them to operate along the northwest coast of Australia (two vessels of the 500-ton class) and west coast of Africa (one vessel of the 1,000-ton class). Some of the catch caught off Africa is being landed in Greece. This same company plans to build a trawler of the 2,000-ton class in 1960 at a cost of about US\$1,388,889 and operate it in the Atlantic.

Another Japanese company sent large trawlers of 500 tons to 1,000 tons to Argentina, Australia, New Zealand, and Africa. This company is operating joint undertakings mostly with local interests, and in 1960 it intends to build more trawlers of the 1,000-ton class.

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U.S.S.R. MAY PROPOSE ENLARGEMENT OF NORTHEAST PACIFIC SALMON TREATY AREA:

In December 1959 the Japanese Government informed the Soviet authorities that Japan hopes to open the fourth annual meeting of the Japan-Soviet Fisheries Commission on February 2, 1960, and at the same time presented the Japanese section's proposed agenda. The U.S.S.R. has unofficially expressed an intention during the negotiations to take up the questions of enlargement of the treaty area in the northeast Pacific and illegal operations by Japanese fishing vessels. This intention on the part of the U.S.S.R. has not been confirmed.

An informed Japanese source had the following to say about this report: "In the first and second years' negotiations,

arguments on conservation and on the sharing of the harvest were developed within the framework of 100,000-metric-ton and 80,000-ton quotas, but at the third annual conference in 1959, Prime Minister Kishi, speaking for the Japanese side, proposed to accept an 80,000-ton quota in 1960 in return for a 90,000-ton quota in 1959, and thus the Japanese side itself destroyed the former basis of negotiations. This produced conditions under which it would be natural to consider that the boundaries of the treaty area might be changed, and there will be nothing strange about the U.S.S.R.'s making such a proposal. From the point of view of conservation of the resource, the present treaty line is nonsense. However, when it comes to talking about the division of the harvest, more importance should be attached to the decision of the Soviet authorities to close all salmon fishing in Kamchatka." (Suisan Tsushin, December 28, 1959.)



Mexico

EXPORT DUTIES ON PACIFIC COAST SHRIMP AND SPINY LOBSTERS REVISED:

Effective January 1, 1960 (Diario Oficial, December 31, 1959), Mexico lowered export duties on fresh shrimp and on frozen shrimp originating from the Pacific (with the exception of Salina Cruz, Oaxaca, and Santa Rosalia, Baja California, which follow the rates for the Gulf of Mexico) and increased export duties on spiny lobsters. The new rates were effected by changes in the official prices from 1,700 pesos to 1,223 pesos per 100 net kilograms (about 61.8-44.4 U. S. cents a pound) for shrimp and from 12.20 pesos to 13.50 pesos per gross kilogram (about 44.3 to 49.0 U. S. cents a pound for spiny lobsters. The new rates in terms of United States cents are as follows:

Item	New Rate	Old Rate	Difference
	(U. S. Cents a Pound)		
Shrimp, fresh or iced, net weight	11.337	15.754	-4.417
Shrimp, frozen, net weight	2.131	2.926	-0.795
Lobster, spiny, fresh, iced or frozen, gross weight	3.611	3.274	+0.337

Practically all of Mexico's shrimp exports (about all frozen) are exported

Mexico (Contd.):

to the United States. It is estimated that about 67 million pounds of frozen shrimp were exported to the U. S. during 1959. The present decrease was granted at the request of the West Coast industry which had been complaining of losses due to the decline in the United States market.

Spiny lobster exports, which normally run around 2 million pounds a year, are also practically all to the United States. Most of the lobsters come from Baja California and the majority are exported cooked whole in ice.

Note: See Commercial Fisheries Review, November 1958, p. 81.

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WEST COAST SHRIMP INDUSTRY ASKS FOR GOVERNMENT AID:

Contrary to the somewhat optimistic outlook made earlier in 1959 for Mexico's west coast shrimp fishery, the industry almost reached the point of financial stagnation at the end of 1959 due primarily to (1) an approximate 35-percent decrease in prices in the United States market and (2) an increase in the proportion of small size shrimp in the catches. Late in 1959 some small shrimp-producing firms in northern Sinaloa ports were forced to tie up their boats and larger operators in Guaymas and Mazatlan who claimed to be losing from 2,000-3,000 pesos (US\$160-240) a metric ton were reported ready to tie up their fleets if Federal Government assistance was not forthcoming soon.

Shrimp processors, the fishing fleet owners, and others directly interested in the industry held urgent meetings in November 1959 in an effort to determine ways and means to continue shrimp fishing operations in the northern Gulf of California. They were in general agreement that assistance would have to come from the Federal Government in the form of (1) a temporary cancellation or reduction of the ad valorem export tax on shrimp; (2) a reduction in the price of Diesel fuel which was increased sharply this year; (3) relief from contracts with fishermen's cooperatives requiring that an established sum be paid for shrimp catches; and/or (4) a direct subsidy. Petitions to the Federal Government were

made for such assistance and there was some indication that serious consideration was being given to them in Mexico City.

The Mexican shrimp industry seemed to realize that it could help itself, however, by agreeing to limit its catches to larger-size shrimp as it became apparent that the change in the closed season in 1959 had not been helpful in producing increased numbers and larger sizes of shrimp. (U. S. Consulate report from Nogales, December 31, 1959.)

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WEST COAST SPINY LOBSTER CATCH DOWN FROM 1958/59 SEASON:

The spiny lobster fishery (season from October 1 to March 15), located in Mexico's State of Baja California, got off to a slow start this season and expectations are that the 1959/60 catch will be considerably below that of 1958/59. As of mid-January 1960, the catch was estimated to be down 20 percent. The reasons for the low catch are: (1) storms and general bad weather; (2) the fact that there was a delay in obtaining permits from the proper governmental authorities; (3) an alleged delay in receipt by the fishery cooperatives of credit from the Banco de Fomento--an allegation, however, which the bank says is not accurate; and (4) alleged lack of interest on the part of the fishermen because of their large debt to the bank. They are said to be reluctant to go out because they feel they have nothing to gain.

The Regional Federation of Fishing Cooperatives (Federacion Regional de Cooperativas Pesqueras) who do almost all the lobster fishing have an indebtedness of some 9 million pesos (US\$721,000) to the Banco Nacional de Fomento which is to be gradually paid off by deductions from receipts from the sale of lobsters. In addition, each year at the beginning of the season the cooperatives must borrow further sums for equipment and supplies. This year the bank reports that 80 percent of the sums borrowed have been amortized. (United States Consulate dispatch from Tijuana, dated December 24, 1959.)

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Morocco

FISHERY TRENDS, FOURTH QUARTER 1959:

At the beginning of the fourth quarter of 1959, Operation Fish (the Moroccan Ministry of Health campaign to increase domestic fish consumption) was extended from Rabat to Casablanca. The drive started with much publicity on October 10, 1959, with speeches and public appearances of officials, roving loud-speakers, and great quantities of fish at ten cents a kilo (4.5 cents a pound). The initial momentum was reduced somewhat a few days later when the supply of fish ran out. However, by the end of November, Casablanca was taking deliveries of ten tons a day. Increased domestic sales should do something to solve the dilemma of the fishing industry whereby the export of fresh fish is strictly limited because the canners fear that the fish will be canned overseas and thereby reduce their own sales, and on the other hand, not enough markets can be found for either Moroccan canned or fresh fish.

The industry was also helped by the October devaluation of the Moroccan franc. The 650,000 unsold cases of sardines reported in the third quarter of 1959 are said to have been sold along with all of the catch of this season. While devaluation has eased sales, the long-run effects cannot yet be clearly seen.

While canned sardines remain the basic element in the Moroccan fishing industry, signs are increasing that more diversification is taking place. Fish byproduct plants are taking up to 70 percent of the catch in Agadir. It has been announced that edible fish meal has been put on sale in all the pharmacies in the country. More mackerel is being canned and sold on the local market, and plans are being made to increase foreign sales.

The total fish catch in 1959 was not spectacular. Storms drove the fish away from Agadir and Essaouira into regions farther north such as Safi, where the fishing was good until

late in 1959. Although quantity was good, quality was not up to previous canning standards.

Another tuna net (madrague) has been installed, this one in the Tangier region,



at Cap Negra. There are now ten fixed tuna nets operating off the Moroccan coast. (United States Embassy report from Rabat.)



Netherlands

TWO STERN FISHING TRAWLERS ORDERED FROM SHIPYARD:

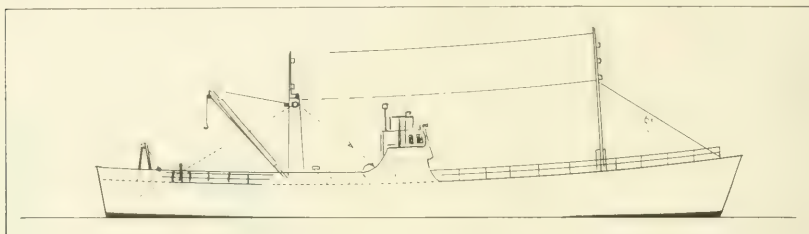
A Dutch shipyard at Landsmeer has received an order for the construction of two stern-fishing trawlers. The ships will have the following dimensions: length over-all, 163 feet 9 inches; length between perpendiculars, 143 feet 8 inches; breadth 27 feet 11 inches; depth to maindeck, 20 ft. 4 inches; and depth to tweendeck, 13 feet 6 inches.

The keel of the first vessel has been laid; this vessel is scheduled for launching early in 1960. It will be powered by

Netherlands (Contd.):

twin Diesel engines, each developing 500 hp. They will drive controllable-pitch propeller through a reduction gearbox. The hydraulically-driven trawl winch will

skippers can finalize the fishing procedure. Although it is known that certain difficulties encountered abroad have been solved after many experiments, the adoption of foreign systems is not always feasible as Netherlands trawlers gener-



New Dutch stern-fishing trawler--163 feet long; Diesel powered.

be placed abaft the wheelhouse and the fishing gear will be hauled from gallows placed at the stern. Living accommodation will be provided for a complement of 15.

When hauling the net the danlenos will come up to the quarters under the gallows. The net is then lifted by the trawl winch with a heaving line running through blocks fitted to the crosstrees, the net being brought to the upper deck via a ramp at the stern. A hatch in the upper deck is then opened, through which the fish reaches the working deck below.

Each of the two samson posts aft is fitted with a heavy derrick which enables the net to be lifted up still further, so that all the fish is emptied out. They also serve to position the net in readiness for shooting. Cleaning and sorting of the fish is carried out on the second deck, a conveyor belt being installed for the transport of the fish to the forward part of the vessel, where hatches give access to the fish hold. A processing plant will be installed on the tweendeck and there is enough room for the installation of a fish-meal plant.

The correct positioning of the gallows, the blocks, and further equipment for the rapid hauling and shooting of the net is still being studied. A scale model has been made with the aid of which the builders in cooperation with a number of trawler

ally use different types of nets, while in addition, the foreign systems and forms of stern are patented. (*World Fishing*, December 1959.)



Norway

GOVERNMENT AID TO COD FISHERMEN FOR 1960 REDUCED:

Representatives of North Norway's cod fishermen's organizations and the Norwegian Ministry of Wages and Prices reached an agreement in December 1959 on the amount of Government aid to be extended to the cod fishermen of the area during 1960. Under the terms of the agreement, the Ministry will seek an appropriation of 10 million kroner (US\$1.4 million) to support the prices received by the fishermen and an appropriation of 2 million kroner (\$280,000) to finance certain marketing expenses of the marketing organizations. It was further agreed that the Government will subsidize 20 percent of the cost of the fishing tackle expenses and 10 percent of the cost of the bait. Finally, it was agreed that the Government would raise the guaranteed minimum wage from 75 kroner (US\$10.50) to about 100-125 kroner (\$14.00-17.50) per week, and that it will abolish the turn-over tax on the sale of fish and fish products. The cod fishermen are reportedly somewhat dissatisfied

Norway (Contd.):



Medium-size dual-purpose commercial fishing vessel at dock, Os, Norway.

with the amount of the aid, but it was approved by Norges Raafisklag.

In 1959 the Government supported cod prices with an appropriation of 34 million kroner (US\$4.8 million). According to an official of the Ministry of Fisheries, the total value of Government aid to North Norway cod fishermen in 1960 (price supports plus subsidies, etc.) will be about 28 million kroner (US\$3.9 million), the United States Embassy in Oslo reported on December 24, 1959.

HERRING FISHERMEN RECEIVE MORE AID:

Representatives of the Norwegian herring fishing industry and officials of the Ministry of Prices and Wages have recently reached agreement on prices for the catch and the amount of Government aid during the 1960 herring fishing season. Because of the failure of the herring fisheries in 1958 and 1959, the fishermen are in a difficult financial position and consequently demanded more support than in previous years.

The following are the main points of the agreement: buyers will pay the same prices as in 1959, but the fishermen will

be permitted to draw 20 million kroner (US\$2.8 million) from the Price Fund for price supports--the fishermen had drawn 16 million kroner (about US\$2.2 million) in 1959 and sought 35 million kroner (US\$4.9 million) in 1960; the Government for the first time will subsidize part of the costs of repairs and equipment--the amount of the subsidy will be 20 percent; and the fisherman's minimum wage, which is guaranteed by the Government, will be increased from 75 to 100 kroner (US\$10.50 to 14.00) a week. According to an official of the Ministry of Fisheries, the agreement met the demands of the fishermen by only little more than half. (U. S. Embassy report from Oslo, December 18, 1959.)

REPORT TO PARLIAMENT OUT- LINES VITAL NEEDS OF FISHERIES:

Recommendations for policies to guide the future development of Norwegian fisheries were the subject of a two-day debate in Parliament in December 1959. Speakers of all parties expressed general support for the Fisheries Committee's report on the comprehensive proposals drafted by the Brofoss Commission. The Fisheries Minister also received considerable backing for his views

Norway (Contd.):

which on several points differed from those of the Parliament's Fisheries Committee. In his statement to Parliament, the Fisheries Minister said a series of Government bills would be drafted to incorporate some of the proposals for short-range measures to help fishermen and the fishing industry.

The debate was opened by the Laborite chairman of the Fisheries Committee and manager of the report on the Brofoss Commission recommendations. The most important points in the committee report were as follows:

1. The target of the fisheries policy should be to assure fishermen an adequate annual income, preferably above the income level in other industries. The long-range objective should be to create a profitable fishing industry without state support. But during the transition period it would be necessary to provide suitable subsidies.
2. It is of the greatest importance for the fishing industry to obtain easier credits, lower operating expenditures, and more liberal tax arrangements.
3. In order to assure continuous supplies of raw materials for the frozen fillet industry, loans and condemnation subsidies are required to make the present fishing fleet more modern and efficient, without a general expansion.
4. To equalize the supply of raw material in poor fishing periods, the regular fishing fleet should be supplemented with specially-built ocean-going vessels, including trawlers.
5. In certain districts it is necessary to establish fishing firms which will use trawlers and other special vessels to procure raw materials in distant waters.
6. Parallel with these proposals for the fishing industry, concerted efforts should be made to develop other industries in the coastal districts of Norway.

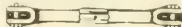
In his statement to Parliament, the Fisheries Minister maintained that the traditional coastal and seasonal fisheries

in coming years would offer little or no possibility for increasing the profitability or the production of the fishing industry. Future opportunities, he declared, lie in fisheries in distant ocean areas. But this will require larger vessels, including trawlers, and a start towards acquiring experience in this type of fishing.

He also said, scientific investigations indicate that the failure of Norway's coastal fisheries in recent seasons was principally caused by a reduction in the influx of fish. For that reason, he argued, modernizing the present fishing fleet could not be counted on to increase the coastal fish catch. The solution is to acquire a fleet of ocean-going fishing vessels, especially large trawlers.

The Fisheries Minister expressed great confidence in the future opportunities for Norway's postwar developed fish fillet industry, especially in view of the acceptance of frozen fish as tariff-free products within the "Outer Seven" free trade area. In this connection, the minister declared it should be feasible to double the combined output of Norway's fish-filleting plants from 25,000 to 50,000 metric tons a year. Such an expansion would in large measure solve the problem of seasonal unemployment in coastal districts. But if domestic vessels are unable to supply enough raw material for the filleting plants, he warned, it may become necessary to consider whether to permit foreign fishing vessels to deliver their catches in Norwegian ports.

Many speakers agreed that a gradual switch to trawlers and other large fishing vessels would be highly desirable. At the same time, however, modernization of the coastal fishing fleet should not be neglected. The Fisheries Committee asserted that the fish catch could be increased by rationalizing and modernizing the coastal fleet. It was emphasized that the Committee by no means was opposed to an expansion of deep-sea and year-around fisheries. The committee report gives a green light to the frozen fish industry to acquire larger vessels, including trawlers, if these prove to be more profitable. (News of Norway, December 17, 1959.)



Panama

SHRIMP INDUSTRY:

Panama's shrimp fishery (shrimp exports rank second in value of all Panamanian exports) has been undergoing some severe tests during 1958 and 1959. Like the United States, Mexico, and Ecuador she overbuilt her fleet during the 1956-58 boom. One of the particular inducements was the excellent run of pink shrimp early in 1957. The industry was expecting even a better run in 1958, but it failed to appear in that year and in 1959. The failure of the pink shrimp run in 1958 and 1959, coupled with the price break in the United States market, has caused considerable retrenchment in Panama. The fleet has been and is continuing to be reduced, and several of the freezing companies have combined or are combining their operations to reduce production costs. It is believed that most of the shrimp vessel owners currently are losing money.

Over half the 1958 exports were peeled and deveined "titi" (seabobs and another smaller species). Owing to price problems very little "titi" as of mid-November 1959 were being processed.

Panamanian boats in September 1959 encountered, off Punta Mala, pink shrimp in areas suitable for trawling in depths of 35-40 fathoms. Catches were good, 3,000-5,000 pounds of heads-off per 7-day trip, but prices have not been satisfactory. In the past the pink shrimp fishing season has been from December to March or April.

Landings: Panamanian landings include heads-off white shrimp and heads-on and heads-off pink, titi, and tiger shrimp. There is no precise breakdown according to the categories listed.

Year	Landings (All Species)	Value	Landings by Variety ^{1/}			
			White	Pink	"Titi" and Tiger	
	1,000 Lbs.	US\$ 1,000 (1,000 Lbs.)			
Jan.-June						
1959	7,496	2,844	2/	500	2/	
1958	10,071	4,936	3,500	500	6,000	
1957	9,268	5,465	4,000	2,300	3,000	
1956	6,645	2,503	4,100	800	1,700	

^{1/}Automated. ^{2/}Unavailable.

With the intense fishery that has been going on in Panama for the past several years it appears that the white shrimp potential, providing those years are representative, does not exceed about 4 million pounds a year.

The species breakdown of white shrimp landings runs approximately as follows: 80 percent *Penaeus occidentalis*; 15 percent *P. stylirostris*; and about 5 percent *P. vannamei* and *P. californiensis*.

Shrimp Fishing Fleet: As of mid-November 1959 there were reported to be 161 shrimp trawlers in Panama. This is a decline of about 50 boats from the peak number fishing in 1958. Industry sources claim that there are less than 150 boats actually fishing. It is expected that about 16 boats will soon depart for operations in Colombia and perhaps a few to Nicaragua. The Panamanian shrimp fishing fleet increased from 10 vessels in 1950 to a high of 205 vessels in 1958.

All vessels are Diesel-powered. About 25 vessels are between 40-50 feet. All of the newer vessels run 60 feet in length and it is estimated that there are more than 100 in that class. The remainder are between 50 and less than 60 feet in length.

During the latter part of 1959 there were no shrimp vessels being built in Panama. Panama has had two very lean years as far as shrimp vessel operations have been concerned and the shrimp fleet started to decline around mid-1958. If shrimp prices continued to hold at November 1959 levels, the number of vessels in the fleet was expected to decline still more.

Shrimp Processing Costs: Production costs for shrimp in Panama vary considerably depending upon the quantity handled and the efficiency of the plant. For white shrimp

the costs are as follows: ex-vessel price 65 U.S. cents a pound. Unloading, carting, grading, packing, and freezing, 6-10 cents a pound; and for cartons, cases, and strapping, 2.5 cents a pound. Shipping costs from Panama City are about 3.85 cents a pound and from Cristobal about 3.35 cents a pound (gross weight). Total cost of frozen shrimp aboard ship at U. S. port is about 80 U. S. cents a pound.

Ex-Vessel Shrimp Prices: Ex-vessel prices for Panamanian headless white shrimp were 65 U. S. cents a pound. Practically all of the white shrimp fall in the three top sizes—20 and under count. The price for pink headless shrimp was 35 cents a pound up to mid-November, but dropped to 33 cents a pound at the end of November 1959. The ex-vessel price for headless "titi" shrimp was 10 U. S. cents a pound.

The above prices are paid according to the type of shrimp. No differential in price is made according to the size of the shrimp. Processors, however, are now trying to discourage the vessels from bringing in the smaller sizes of pink shrimp because the processors are losing money on counts over 35 shrimp to the pound.

Export Prices: The export prices as of November 20, 1959, f.o.b. Panama for five-pound packages (jumbled pack) were: white shrimp headless 80 U.S. cents a pound for shrimp under 20 count to the pound. Practically all of Panama's landings and exports of white shrimp are 20 count and under; pink shrimp, headless, 60 U.S. cents a pound for 16 to 20 count with a 5-cent drop for each smaller size group to 30 cents for 50 to 60 count; "titi," peeled and deveined, a flat 35 U.S. cents a pound.



The Government of Panama, on the advice of a FAO fishery research expert, has set up, staffed, and equipped a marine fishery research station where research on Panama's shrimp resources is being carried out. FAO expert catching shrimp samples in a mangrove swamp.

Table 2 - Panama's Frozen Shrimp Exports to United States, 1956-58 and January-June 1959

Jan.-June 1959 ^{1/}		1958		1957		1956	
1,000 Lbs.	US\$ 1,000	1,000 Lbs.	US\$ 1,000	1,000 Lbs.	US\$ 1,000	1,000 Lbs.	US\$ 1,000
5,029	2/	8,084	5,614	8,263	6,181	5,977	4,427

^{1/}From United States import data; other figures are from Panama export data.

^{2/}Not available.
Note: Export value (f.o.b. Panama in U. S. cents per pound: 1958—49.44; 1957—74.84; 1956—74.84.

Exports: The Panamanian official export statistics approximate fairly closely the United States import data. Dur-

Panama (Contd.):

ing 1958, Panama exported about 230,000 pounds more shrimp than originated in Panama. It is estimated that about 130,000 pounds of shrimp from Colombia and 100,000 pounds from Nicaragua were processed in and exported from Panama to the United States in 1958. (U. S. Embassy dispatch, dated November 30, 1959, from Mexico.)



Peru

EXPORTS OF MARINE PRODUCTS,
JANUARY-SEPTEMBER 1959:

Exports of principal marine products by Peru in January-September 1959 amounted to 242,265 metric tons (valued at US\$31.4 million). Fish meal exports (184,090 tons) for the first nine months

Exports: Practically all of Peru's landings of heads-off under 20 count size shrimp are exported to the United States. Exports totaled 503,000 pounds in 1958, 736,000 pounds in 1957, and 359,000 pounds in 1956.

Exports of fishery products from Peru are subject to permit issued by the Bureau of Fish and Wildlife of the Ministry of Agriculture, and licensing by the Ministry of Finance and Commerce. In practice such authorizations are readily obtainable for most fishery products. Export taxes are as follows:

Law No. 10545, April 16, 1946 (amending Article 1 of Law 9506): 10 percent ad valorem tax on the difference between officially-fixed production cost per short ton of 907,184 kilograms, net weight, and the price in the United States (Pacific coast), less freight and insurance. (Average prices as reported by Peruvian consuls in the United States to the Peruvian Ministry of Finance and Commerce).

Law No. 9466, December 18, 1941: Additional 10 percent ad valorem tax on all export products, applicable when export price exceeds by 25 percent the officially-fixed production costs (payable on the excess). Calculation of production costs for tax assessment purposes: For the assessment of export taxes according to Laws Nos. 10545 and 9466, the following basic production costs are currently used:

Peruvian Exports of Principal Marine Products, January-September 1959							
Product	July-September 1959			January-September 1959			
	Quantity	Value ^{1/}		Quantity	Value ^{2/}		
		Metric Tons	Million Soles		Metric Tons	Million Soles	
Fish meal	60,510	193.2	6,534	184,090	553.9	21,341	
Fish (frozen, canned, etc.)	13,275	81.4	2,879	30,483	197.8	7,230	
Fish oil	6,888	19.4	656	13,814	36.3	1,327	
Sperm oil	3,873	12.7	449	7,904	26.3	961	
Fertilizer (guano)	3,044	7.2	225	3,449	8.2	300	
Whale meal	700	2.4	85	2,525	7.8	285	
Total	88,290	316.3	11,188	242,265	860.3	31,444	
1/F.o.b. values converted at 28.27 soles equal US\$1 for 3rd quarter of 1959.							
2/F.o.b. values converted at 27.36 soles equal US\$1 for the first nine months of 1959.							

of 1959 were up about 140.0 percent as compared with the same period of 1958 and 379.6 percent as compared with January-September 1957. Exports of marine products other than fish meal were also up sharply during January-September 1959.

* * * * *

SHRIMP INDUSTRY:

Landings: The Peruvian fishery for salt-water shrimp is limited to a narrow strip about 30 miles long near Tumbes, off the northern tip of the country. A survey of the shrimp resources made in 1955 predicted that the area could produce from 600,000 to 900,000 pounds of heads-off shrimp annually. Fresh-water shrimp taken from lakes and streams are consumed entirely in Peru. In 1958 the estimated landings of heads-off salt-water shrimp amounted to about 509,000 pounds, or about 32.8 percent below the 758,000 pounds landed in 1957, but 31.2 percent higher than the 1956 landings of 388,000 pounds. Heads are removed on board the vessel.

Production cost per short ton of 907,184 kg., net weight (Soles)

Frozen shrimp ("Langostinos") - Supreme Resolution, Sept. 4, 1953 Soles 9,300 (US\$339.45)

Law No. 7540, June 30, 1932 (Unemployment tax): 1 percent ad valorem tax on all exports from Peru.

Law No. 10811, March 3, 1947: 2.00 soles (7.3 U.S. cents) per metric ton gross weight. (Payable on exports from all Peruvian ports).

Supreme Decree of March 6, 1942 (As amended by Supreme Decree No. 71, July 22, 1955): All exports through the ports of Callao, Matarani, and Mollendo are subject to the payment of a port charge of US\$1.60 per metric ton, weight or volume. Exports through other Peruvian ports pay a charge of US\$0.30 per metric ton, weight or volume.

Law No. 11537, December 18, 1950: 2 percent tax on the cost of ocean freight, as shown in the bill of lading. Applicable on all exports.

Fishing Fleet: As of November 1959 there were only two companies with a fleet of 13 vessels engaged in the Peruvian

Table 1 - Peru's Landings and Exports of Heads-Off Shrimp, 1956-1958

Year	Landings			Exports			
	Quantity	Value		Quantity	Value		U. S. \$ lb.
	1,000 Lbs.	Million Soles	US\$1,000	1,000 Lbs.	Million Soles	US\$1,000	
1955	509	4.8	196	503	4.5	184	80.7
1957	758	6.1	321	736	5.7	300	89.8
1956	388	2.4	126	359	2.2	116	71.2

Note: Values converted to US\$ as follows: 1958, 24.49 soles equal US\$1; 1956 and 1957, 19.0 soles equal US\$1.

Peru (Contd.):

Table 2 - Peruvian Production Costs of Frozen Shrimp, November 1959			
Cost 1/	Soles/Metric Tons	US\$/Metric Tons	US¢/lb.
Ex-vessel price . . .	21,000	766.51	34.8
Packing	1,000	71.18	3.2
Labor for packing . .	1,500	54.75	2.5
Freezing & ice used on vessels	1,300	47.45	2.2
Export duties	3,900	142.35	6.5
Total	29,650	1,082.24	49.2

1/Estimated for under 20-count size shrimp.

Note: Peruvian soles converted to US\$ at rate of 27,397 soles to US\$1.

an shrimp fishery--6 of the vessels are 40-42 feet and 7 are 36-38 feet in length. The shrimp vessels are all equipped with Diesel engines of 50-105 hp. The fleet of shrimp vessels was built in Peru and are all Peruvian-flag vessels. There are no plans at present for building any new shrimp vessels.

Production Costs: Costs of producing frozen heads-off shrimp for export in November 1959 were about 49.2 U.S. cents a pound in Peru. Dockside cost of the headless shrimp was 34.8 U.S. cents a pound, and other costs including containers, labor, freezing, export duties, and the ice supplied to the vessels, amounted to 14.4 U.S. cents a pound, or almost US\$982 a short ton. Costs for ocean freight, warehousing, and handling costs at the U. S. port of entry, and broker's commission of about 7-1/2 percent amounted to 19.3 U.S. cents a pound.



Philippines

USE OF FLOATING FISH CANNERIES AND VESSELS RECEIVED FROM JAPAN:

The Philippine Legislative Committee on Good Government has revealed that the two floating fish canneries received as part of Japanese reparations payments late in 1958 from Japan have never been used. The investigation by the Committee brought out that the floating fish canneries plus six fishing vessels had been awarded to an Iloilo farmers' cooperative marketing association and that the cooperative had no plans to use the equipment. The fish canneries and the six fishing vessels are valued at about US\$2,250,000.

As a result of the investigations, the Reparations Commission Chairman has announced the withdrawal of the award of the vessels to the cooperative and that they would be awarded to concerns able to utilize them properly. He also announced that several Philippine firms were interested in removing the cannery equipment from the two floating fish can-

neries for use in establishing canning plants ashore. The two large vessels would then be converted for use in the interisland trade

Four of the six fishing vessels have been completed by the Japanese and in December 1959 were anchored in Tokyo Harbor because the farmers' cooperative lacked the funds to bring them to Manila. (U. S. Embassy Report from Manila, December 18, 1959.)

* * * * *

NEW FISHERY RESEARCH VESSEL ACQUIRED FROM JAPAN:

Philippine officers and crew members were in Japan early in January 1960 to take delivery in February of the first fishery research vessel built in Japan (built under Japanese reparations payments) for the College of Fisheries of the University of the Philippines. The crew will take special training in the operation of the vessel and its laboratories.

A separate group of the University faculty members has been touring Japan and other countries to study the administration and curriculum of fishery colleges, fish processing laboratories and plants, and fishery market cooperatives. It is hoped that these endeavors will give new impetus to the Philippine deep-sea fishing industry.

The research vessel is the first of two being built in Japan for the Philippines. The other, which is expected to be delivered in the near future, will go to the Government's Bureau of Fisheries. (U. S. Embassy Report from Manila, January 8, 1960.)



Portugal

CANNED FISH EXPORTS, JANUARY-SEPTEMBER 1959:

Portugal's exports of canned fish during January-September 1959, amounted to 51,804 metric tons (2,830,000 cases), valued at US\$26.6 million, as compared with 43,410 tons, valued at US\$23.1 million, for the same period in 1958. Sardines in olive oil exported during the first

Portugal (Contd.):

nine months of 1959 amounted to 37,662 tons, valued at US\$18.2 million.

Portuguese Canned Fish Exports, January-September 1959		
Species	Metric Tons	US\$
Sardines in olive oil	37,662	18,213
Sardine & sardinelike fish in brine	1,127	225
Tuna & tunalike fish in olive oil	3,199	2,241
Anchovy fillets	4,870	3,566
Mackerel in olive oil	2,909	1,443
Other fish	2,037	942
Total	51,804	26,633

During January-September 1959, the leading canned fish buyer was Germany with 11,429 tons (valued at US\$5.7 million), followed by Italy with 7,497 tons (valued at US\$4.3 million), United States with 5,158 tons (valued at US\$3.5 million), Great Britain with 4,485 tons (valued at US\$2.1 million), and France with 3,219 tons (valued at US\$1.6 million). Exports to the United States included 1,996 tons of anchovies, 783 tons of tuna, 2,242 tons of sardines, and 37 tons of mackerel. (Conservas de Peixe, November 1959.)

CANNED FISH PACK, JANUARY-SEPTEMBER 1959:

The total pack of canned fish for January-September 1959 amounted to 37,498 metric tons as compared with 35,632 tons

Portuguese Canned Fish Pack, January-September 1959		
Product	Metric Tons ¹	1,000 Cases
In Olive Oil:		
Sardines	26,932	1,417
Sardinelike fish	544	28
Anchovy fillets	4,343	434
Tuna	4,065	145
Mackerel	533	21
Other species	1,081	57
Total	37,498	2,102
¹ Net weight.		

for the same period in 1958. Canned sardines in oil (26,932 tons) accounted for 71.8 percent of the January-September 1959 total pack, up by 23.2 percent from the pack of 21,866 tons for the same period of 1958, the November 1959 Conservas de Peixe reports.

FISHERIES TRENDS, JANUARY-SEPTEMBER 1959:

Sardine Fishing: During January-September 1959, the Portuguese fishing fleet

landed 69,765 metric tons of sardines (valued at US\$6,994,224 ex-vessel or about \$100 a ton).

September 1959 landings of sardines totaled 24,523 tons valued at US\$2,158,504. Canneries purchased 59.3 percent, or 14,553 tons, of the sardines (valued at US\$1,415,443 ex-vessel or about \$97.26 a ton) during September 1959. A total of 9,572 tons was purchased for the fresh fish market, and 398 tons were salted.

Other Fishing: The January-September 1959 landings of fish other than sardines were principally 22,944 tons of chinchards (value US\$1,514,817) and 3,032 tons of anchovies (value US\$276,591). (Conservas de Peixe, November 1959.)

TUNA FISHERY LIMITED TO FEW TRAPS AND TWO MODERN CLIPPER-TYPE VESSELS:

The Portuguese landings of tuna are derived primarily from five coastal fish traps located along the Algarve coast and two modern 840-gross-ton clipper-type vessels which fish in the Atlantic and land wherever there is a market. Catches of tuna are landed at several ports, but primarily at Villa Real de Santo Antonio and Tavira. The traps (4 are near Tavira and 1 near Cape Santa Maria) are fished from May to August, or during the period when the bluefin tuna are migrating to and from the Mediterranean. The tuna clippers have been converted from Diesel-powered submarine chasers and fish the year-around. These two vessels often land catches in Italy and France.

The tuna landings are almost entirely canned in the Villa Real de Santo Antonio area. The cannery purchase foreign-caught tuna when supplies from the Portuguese fishermen are not available. (U. S. Embassy Report from Lisbon, December 18, 1959.)



South-West Africa

PILCHARD-MAASBANKER FISHERY TRENDS:

The busiest and most successful season in the ten-year history of the South-

South-West Africa (Contd.):

West Africa Walvis Bay pilchard fishing industry closed at the end of October 1959 with a record catch of 300,000 short tons.

The South-West Africa catch added to the record total of the South African fishery brings the total pelagic shoal fish catch for the Union and South-West Africa in 1959 to 642,000 short tons, 86,000 tons higher than the record catch of 1958.

According to reports from South-West Africa, 3 of the 6 processing factories reached their quotas and closed down early in October, 2 had closed down by the middle of the month, and the sixth was expected to reach its quota at the end of October.

The September catch was 49,703 tons of which 154 tons were maasbanker. This catch yielded 6,179,000 pounds of canned fish, 10,876 tons of fish meal, and 2,317 tons of fish-body oil. (The South African Shipping News and Fishing Industry Review, November 1959.)



Spain

COD FISHING INDUSTRY:

For many years one of the staple foods of Spain has been salted and dried cod. Many examples can be seen in that country of stone troughs in which the Phoenicians salted fish.

The early history of the Spanish and Portuguese cod fisheries on the Newfoundland banks was very similar, and traces of their exploitation can still be seen in the place names of the Newfoundland coast. The Spanish gave up fishing in that area about three centuries ago; however, they did not stop eating salted cod, and started to import it from Norway, Iceland, the Faroes, Newfoundland, and Scotland.

After World War I attempts were made to re-establish Spain's position as a cod-fishing nation, and in 1927 a fishing company was established in San Sebastian. Operating with two trawlers to

start with, this company obtained very good results, and later on, after the Spanish Civil War, two other companies were established.

It is important to differentiate between the cod-fishing activities started by these three companies and that done by the "parejas." Pair trawling was started on the Newfoundland grounds in 1939, with very poor results. But when these vessels recommenced operations in 1949 they did much better, and in the 1959 season 72 "pareja" vessels were due to fish in Newfoundland waters.

By August 1960 the San Sebastian firm will own 19 trawlers--14 Diesel vessels and five oil-burning steamships. Their sizes range from the 1,190 g.r.t. (gross registered tons) of the steam vessel Euskal Erria to the 1,350 g.r.t. of the motor-ship Tornado, and the total tonnage owned by the company amounts to approximately 24,000 g.r.t.

This company also manages two processing plants, one in Pasejes (Spanish Basque country) covering 230,000 square feet and complete with two wharves, driers, storage rooms, general stores, etc. The other plant is in El Ferrol, and covers some 170,000 sq. ft.

The second firm owns 4 trawlers and has two more ordered from Seville shipyards. The 4 in operation are all Diesel-powered, each of 975 g.r.t. This company also owns a plant in Chapela-Vigo, similar to those of the first company.

The third firm located in Corunna owns 12 trawlers, all Diesel-powered and ranging from 1,250 to 1,363 g.r.t. The total tonnage of this fleet is about 16,200 g.r.t., and the company owns one plant in Corunna. This is the largest and most modern of the Spanish cod plants.

Of the firms operating "pareja" vessels in the cod fisheries, one firm appears to be the most important. This firm is an industrial complex with two other associated companies and manages 120 fishing vessels.

The plant operated by the industrial complex covers an area of 323,000 sq. ft.

Spain (Contd.):

with an annual production of 12,000 metric tons of dried cod. The companies in the industrial complex also have interests in wholesale, freezing, fish meal, insurance, and other fishing activities.

There are several other firms operating "pareja" vessels in North American waters. These companies sell their catches to many small plants established in Corunna, Vigo, Gijon, and Pasajes.

In general, the trawlers make two trips each year. The first is from January or February to June, and the second from July or August to November or December. The "parejas" begin their trips in March or April, and make their last trip during September or October.

Some of the "pareja" vessels return to Spain as soon as their holds are filled with salt fish, while others transfer their catches to specially chartered cargo vessels and continue to fish.

In spite of the development of her own cod-fishing fleets, Spain continues to import dried and salted cod, 14,293 metric tons being imported from January to November 1958. The total consumption in Spain is thought to be about 70,000 metric tons annually, but for some reason the Spanish liking for this food has fallen noticeably since the end of the Spanish Civil War.

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TUNA FISHERY, 1958:

Two species of tuna make up the bulk of the Spanish tuna landings. The albacore tuna (*Germo alalunga*) is caught by vessels based in northern and northwestern Spanish ports. The main ports for this species are: Bermeo, Vigo, Aviles, Gijon, Zumaya, La Coruna, Santona, Ondarroa, Santander, Lequeitio, and Vivero. In 1958, the landings at the four leading ports amounted to 5,700 metric tons at Bermeo, 5,000 tons at Vigo, 4,600 tons at Aviles, and 3,000 tons at Gijon. Landings at each of the other ports exceeded 1,000 tons, but were less than 2,000 tons.

Bluefin tuna (*Thunnus thynnus*) is landed principally at ports located in the south

of Spain. The ports with the largest catches in 1958 were: Barbate, San Fernando, Tarifa, and Ceuta. The landings amounted to 4,200 tons, 2,300 tons, 1,500 tons, and 1,000 tons, respectively. (United States Consulate, Vigo, report of December 17, 1959.)

**Surinam**OFFSHORE SHRIMP TRAWLING INCREASED IN 1959:

Shrimp trawling for large shrimp in Surinam's offshore waters began in October 1958. Prior to that date commercial shrimp fishing was confined largely to inshore waters for the small seabob. Offshore shrimp trawling was started with two trawlers. Four more vessels were added to the fleet in March 1959 and three more in August 1959. By 1960, the American-owned company, which has exclusive rights to Surinam shrimp exports, expects to have a fleet of 25 trawlers. Most of the trawlers are 65 feet in length and equipped with 150 hp. Diesel engines.

Landings made by the offshore shrimp vessels for the 12-months period ending October 1959 amounted to about 300,000 pounds of pink shrimp. Exports during that period were about 279,000 pounds (all to the United States except for a very small quantity to Curacao), valued at about US\$210,000 at the primary receiver level in New York City. Prices to the vessels in November 1959 were 42 U. S. cents a pound for heads-off shrimp.

There are no export taxes on shrimp exports from Surinam. Although the American owned shrimp fishing and processing firm holds the exclusive right to export shrimp from Surinam, the Surinam Government retains the right to issue export licenses for shrimp, fish, and fish derivatives for up to 88,000 pounds a year, except that licenses for export of dried shrimp cannot exceed half this amount. (United States Consulate report from Paramaribo, November 18, 1959.)



U.S.S.R.

EIGHT FISHERY CENTERS TO BE ESTABLISHED IN KURILE ISLANDS:

A Moscow broadcast is reported to have announced early in December 1959 that the Soviet Union has decided to establish eight fishery centers in the Kurile Islands in 1960. The centers will be established under the seven-year fishery plan. In addition to mackerel-pike fishing bases, processing and distributing plants will be constructed. Mackerel-pike fishing by the Soviet Union has been carried out for the past 2 or 3 years in the Pacific with motherships. It is thought that setting up of shore facilities will coordinate activities of vessels, mother-ships, and land facilities. (Fisheries Economic News, a Japanese periodical, December 4, 1959.)

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NEW FACTORYSHIP HEADS WHALING FLEET:

On October 10, 1959, the Slava whaling fleet left the Black Sea port of Odessa for its 14th season in the Antarctic. The Slava whaling fleet now consists of the old flagship Slava and 12 new high-speed Diesel-electric whalers.

The second and new fleet set sail a few days later. This is the Soviet Ukraine fleet, a fleet of 20 whalers with the new factoryship whaler Soviet Ukraine as flagship.

This new vessel was built in less than three years at the Nosenko Shipyard, Nikolayev, on the Black Sea, and is the world's biggest ship of its kind, having a displacement of 44,000 tons--15,000 tons more than the Slava.

The Soviet Ukraine is 716 feet over-all (218 meters), has a beam of 92 feet (28 meters), and "stands as tall as a 12- to 14-story building."

It is equipped with mechanized processing lines and scientific laboratories. Its skipper said of this ship:

"The Soviet Ukraine is on a level with the very latest in shipbuilding. More than a thousand designers and some 500 fac-

ories of the Moscow, Latvian, Kiev, Leningrad, Kharkov, Khabarovsk, Rostov, and other Economic Councils took part in designing and supplying equipment for it."

The Soviet Ukraine can freeze some 100 metric tons of whale meat and livers daily, and store 1,800 tons of frozen products in its cold storage section.

There are 265 well-appointed one- and two-berth cabins for the crew. (World Fishing, December 1959.)

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NEW FLOATING FACTORYSHIP FOR CRAB AND FISH PROCESSING:

A floating crab and fish processing vessel is being built in Leningrad for future operation in the North Pacific Ocean. It is to be equipped with the most modern machinery and is the first vessel of that type to be built in the U.S.S.R.

It is a welded vessel with a gross tonnage of 14,000 tons. The length is over 524 feet, with a breadth of almost 66 feet. It will be Diesel-powered and manned by a crew of 130, plus 507 workers for the fish-processing operations.

All processing operations for crab and fish will be mechanized with new continuous cookers for crab, machines for packing crab in parchment paper, etc.

The vessel can remain at sea for two months during which time it can pack 25,000 cases of canned crab, 50,000 cases of canned fish and salmon, plus substantial amounts of canned fish roe and fish meal. The vessel also has possibilities for processing brisling and sardines. (Fiskets Gang, December 10, 1959; translation from Russian newspaper Vodnyi Transport, November 24, 1959.)

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NEW HERRING FACTORYSHIP PLANNED:

The Russian newspaper Vodnyi Transport, November 28, 1959, carries a report and a photograph of the model of the first herring factoryship to be built in the U.S.S.R.

U.S.S.R. (Contd.):

The new factoryship will be welded, with two decks, have a displacement of 15,000 tons, length of 145 meters (475.6 feet), and a breadth of 20 meters (65.6 feet). The main engine, of 6,250 hp., will give the vessel a speed of 14.5 knots.

The ship is designed for anchoring in depths up to 300 meters (164 fathoms). In addition, there will be fenders and similar equipment which will permit trawlers alongside the vessel to unload in a relatively high sea. The new herring factoryship will be completed in 1961. (*Fiskets Gang*, December 24, 1959.)

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NEW HERRING FISH MEAL
AND OIL FACTORYSHIP:

The new floating herring oil factoryship *Lamut*, 4,982 gross tons, is being completed by a shipyard in Japan for Sudoimport, Moscow, according to *Dansk Fiskeritidende* (November 27, 1959), a Danish fishery trade periodical. The vessel is designed for a speed of 12.5 knots and a processing capacity of 120 metric tons of herring per day.



United Kingdom

BAG-NET DEVELOPED FOR
TRANSFERRING CATCHES AT SEA:

The trawler *Northern Sea* tied up at Grimsby, England, and ended an experiment which may revolutionize fishing developments in the British industry.

The trawler had taken part in the successful transfer of fish from one trawler to another in the open seas off Bear Island. The owning company has been exploring the possibilities of transfers for some time and has considered many suggestions. They decided that the best system was for fish to be floated off in special nets.

Shaped like huge "sausages," the nets were braided with a mesh smaller than fishing-net mesh. One end was tied up like a trawl's cod end, and the "sausage" was dropped down the fish hold hatch and the other end secured open. Gutted fish was dropped into the open end and when filled, the "sausage" held about a ton of fish. It was tied up at the top and lowered over the trawler's side, secured to a buoy. Several "sausages" were strung together by lines.

As soon as the "sausages" went over the side of the Grimsby trawler *Northern Wave*, a radio message was sent to the *Northern Sea*, then about three miles away. The "sausages" were only in the sea about 20 minutes before being sighted and within an hour the *Northern Sea* had the fish showed away, and was on the way home.

The experiment opens up several possibilities. Trawlers owned by the same company could fish an area while another vessel acted merely as a carrier. Trawlers just starting

fishing could transfer their first few hauls to another ship about to leave for home, as with the *Northern Sea*, and this method would enable ships to stay at sea several days longer without deterioration in catches.

It could also point the way to trawlers fishing in packs and delivering their catch to a mothership which could quick-freeze the fish. At the same time the mothership could refuel the trawlers with oil and ice when they decided to fill up their own fish holds and go home.

The picking up of catches of trawlers about to return home is the most immediately feasible idea and it may lead to owners forming an association among themselves to allow transfers to be made between all ships of one particular port.

The captain of the *Northern Sea*, commenting on the scheme when he arrived home, said: "We arranged everything over the radio the previous night and I was about three miles away from the *Northern Wave* when the 'sausages' were released. We had no difficulty in sighting or hoisting aboard. The weather was good but I can see no great difficulty in carrying out a transfer in winter. It may be a little more difficult but I think it can be done all right."

The transferred fish was landed only six days after being caught and was in good condition. Buyers noted how clean it was, probably because it had had a second washing in the sea during the transfer.

Samples were sent to the fisheries research laboratories at Hull for expert examination (*Canadian Fishermen*, December 1959.)

* * * * *

EARNINGS OF INSHORE
VESSELS, 1958:

The British White Fish Authority carries out annual surveys of the costs and earnings of inshore fishermen. Summaries of total costs and earnings derived from the 1958 survey were included in the Authority's Annual Report for 1958/59 published in July 1959. Since then, following further analysis of the returns, more detailed information has become available.

The results of 460 vessels were included in the 1958 sample--237 in Scotland, 223 in England and Wales; the total value of fish landed by these vessels represented slightly less than one-third of the total inshore catch. The vessels were drawn from every major inshore fishing district, and from no less than 139 different ports.

The size of vessel appears to determine, in general, the size of the net surplus and the level of crews' earnings. Small vessels of under 30 feet in length, which are more common in England and Wales than in Scotland, showed an average profit of £52 (US\$145.60) for the year and an average crew wage of £371 (US\$1,038.80). At the other end of the scale 60-69 foot vessels showed an average profit of £1,318 (US\$3,690.40), and a crew wage of £716 (US\$2,004.80). The

United Kingdom (Contd.):

average net profit per stone could not be computed for all vessels as the weight of fish landed could not always be given. For vessels where the information was given the average profit per stone was 9½d. (10.8 U. S. cents), a little less than it was in 1957.

Operating costs continued to rise in 1958, but oil, the cost of which absorbed 6.2 percent of total earnings, and marine insurance, which absorbed 3 percent, were both a little lower than in 1957. Vessels and engine repairs at 5.3 percent of total earnings and gear upkeep and repairs at 10.2 percent were among the principal items showing increases.

The kind of fishing pursued is not uniform all around the coast and the different methods used result in different degrees of profitability. The table shows the average operating results for vessels in each area. The relatively prosperous fishing area of East and North-East Scotland illustrates the success of the seine-net vessel; whereas the results shown for Eastern England reflect the port sprat seasons which have become a feature of East Coast fishing during the last year or two.

Earnings of Inshore Vessels, 1958					
Country	Average Profit		Average Crew		
	Per Vessel		Wage		
	£	US\$	£	US\$	
Scotland:					
North East	1,091	3,055	692	1,938	
East	775	2,170	598	1,674	
South	989	2,769	689	1,929	
North West and Shetland	613	1,716	540	1,512	
England & Wales:					
North East	460	1,288	628	1,758	
East	54	235	389	1,089	
South East	183	512	399	1,117	
South West	189	529	375	1,050	
Wales	135	378	429	1,201	
North West	211	591	545	1,526	

Subsidy forms an important part of vessel earnings and in 1958 averaged 7.7 percent of total earnings, or an average addition of over £1 (US\$2.80) a week to crews' wages. Because of the greater incidence in England and Wales of fishing for shellfish, which is not subsidized, the averages for England and Wales and Scotland separately show considerable differences. (World Fishing, December 1959.)

Note: Also see Commercial Fisheries Review, January 1958 p. 101.

* * * * *

FISHERMEN TRAINING AND LOAN PROGRAM FOR NORTHWEST SCOTLAND INITIATED:

Because the British Government does not believe that the fishing grounds in The Minch are as productive as they should be, and hence do not make as big a contribution to the economy of the Western Islands as they could, the Government is attempting to revive the fishing industry in the Outer Hebrides. The Minch is the strait between Northwest Scotland and the Outer Hebrides. To encourage young Scotsmen who live in the Outer Islands to become fishermen, a new training program has been drawn up. It will provide up to six months duty on an East Coast fishing boat working in The Minch area. If a man has already completed such a period of training or has had other experience, under the terms of the program he can continue with another six months of training on a special training fishing vessel of the Scottish Home Department. It is hoped that training can start on east coast vessels in The Minch by spring 1960. In conjunction with the plan to select and train fishermen, loans will be extended to persons interested in fishing to enable them to acquire new boats.

Loans for new boats from 40-70 feet in length can be obtained from the Scottish Home Department. The loans can be made up to 60 percent of the approved cost of the boat and a grant of at least 25 percent will be available, leaving only 15 percent of the cost to be raised by the new fishermen. The Macaulay Trust and the Highland Fund are prepared to assist suitable fishermen to raise even the 15 percent of their share. One of the conditions of the loans is that if a grant or loan is made, the applicant "undertakes by means of the proposed boat to diligently and vigorously prosecute fishing as working owners." (U. S. Consulate report from Glasgow, January 6, 1960.)

* * * * *

RESTRICTIONS REMOVED ON FRESH AND FROZEN FISH IMPORTS FROM DOLLAR AREA:

Effective February 1, 1960, quantitative controls were removed by the United Kingdom on imports of fresh and frozen

United Kingdom (Contd.):

fish from the dollar area. This action opens the United Kingdom market to frozen halibut and other fresh and frozen fish from the United States.

Lifting of import restrictions on fresh and frozen fish removes the last vestige of import controls on fishery products imposed by the United Kingdom to conserve short dollar balances following the end of World War II. Limitations on canned salmon were eased in 1957 and completely lifted in 1958. Other canned fish were removed from import control on June 8, 1959. Fresh and frozen salmon were freed from control on November 9, 1959.

Imports of halibut by the United Kingdom from the United States have been restricted under the controls in effect following the end of World War II. The United States supplied up to 3 million pounds of frozen halibut to the United Kingdom in some prewar years. As a result of British efforts to conserve dollars in post-war years, imports of halibut from the United States have been completely restricted. The lifting of these limitations on trade will broaden the market for United States west coast halibut producers.

**Uruguay****NEW FISH MEAL PLANT IN OPERATION:**

The Uruguayan Government-owned fishing company (Servicio Oceanografico

y de Pesca) started operations in its new fish meal plant on January 13, 1960. The machinery for the new plant, which was donated by the United Nations, was imported from the United Kingdom, the United States Embassy in Montevideo reported on January 15, 1960.

**Yugoslavia****FROZEN TUNA IMPORTS FROM JAPAN:**

Yugoslavia is said to have signed contracts for Japanese exporters for annual imports of about 7,000 metric tons of tuna from Japan. This year's deliveries are scheduled for October 1959-May 1960. Yugoslavia, in the past, has been importing frozen tuna from Turkey for the winter operations of its canneries. In 1959, however, no business talks were concluded with Turkey and tuna fishing was carried out in the Black Sea on a small scale by Turkey. Yugoslavia is reported importing about 9,000 tons of tuna a year and about half is re-exported to Italy.

As part of its expansion plans for tuna fishing in summer in the Adriatic Sea, fishermen in Yugoslavia are learning long-line tuna fishing techniques from Japanese expert fishermen (Suisan Tsushin, December 18, 1959.)



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FEDERAL ACTIONS



Department of Health, Education, and Welfare

FOOD AND DRUG ADMINISTRATION

POLICY ON EFFECTIVE DATE OF FOOD ADDITIVES AMENDMENT:

The food additives amendment to the Federal Food, Drug, and Cosmetic Act (72 Stat. 1785 et seq., U.S.C. 342, 348) is scheduled to become fully effective on March 6, 1960, according to a statement of policy issued by the U. S. Food and Drug Administration and published in the December 31, 1959, Federal Register. Extension of time for compliance by food and chemical manufacturers with the requirements of the Food Additives Amendment are covered.

However, the effective date may be extended on a product-by-product basis for a time not to exceed 12 months "on the basis of a finding that such extension involves no undue risk to the public health and that conditions exist which necessitate the prescribing of such an additional period."

After this amendment becomes fully effective, any food in interstate commerce may contain a food additive as de-

fined in section 201(s) of the act only under certain prescribed conditions.

In order that decisions on requests for extension could be published before March 6, 1960, requests and supporting data were to be submitted by February 1, 1960.

Although there are many chemicals commonly used in foods which are generally recognized as safe, there are numerous others for which safe tolerances must be established by regulation. The Agency said it is not possible at this time to determine whether tolerances will be established for them before the Food Additives Amendment will become fully effective. Manufacturers, distributors, users, and food law enforcement officials needed to know the status of those additives under the amendment prior to March 6, 1960, so that they would know whether they may be employed after that date.

The Agency pointed out that all food additives had to be cleared for use before the March 6 date unless an extension was granted. Use of a food additive without a formal authorizing regulation or an extension of time after March 6, 1960, will cause the food containing it to be adulterated and illegal for shipment, the Agency added.

Title 21—FOOD AND DRUGS

Chapter I—Food and Drug Administration, Department of Health, Education, and Welfare

SUBCHAPTER B—FOOD AND FOOD PRODUCTS

PART 121—FOOD ADDITIVES

Subpart A—Definitions and Procedural and Interpretative Regulations

STATEMENT OF POLICY WITH REFERENCE TO EFFECTIVE DATE OF FOOD ADDITIVES AMENDMENT

Under the authority vested in the Secretary of Health, Education, and Wel-

fare by the Federal Food, Drug, and Cosmetic Act (sec. 6(c), Public Law 85-929; 72 Stat. 1789; 21 U.S.C. note under section 342 (1958 amendment)), the following statement of policy is issued:

§ 121.85 Statement of policy with reference to effective date of food additives amendment.

(a) The food additives amendment to the Federal Food, Drug, and Cosmetic Act (72 Stat. 1785 et seq., 21 U.S.C. 342, 348) is scheduled to become fully effective on March 6, 1960. However, this date may be extended on a product-by-product basis for a time not to exceed 12 months "on the basis of a finding that such extension involves no undue risk to the public health and that conditions exist which necessitate the prescribing of such an additional period."

(b) After this amendment becomes fully effective, any food in interstate commerce may contain a food additive as defined in section 201(s) of the act only if:

(1) The additive and its use, or intended use, conform to the terms of a regulation that provides for an exemption from the requirements of the food additives amendment for any food additive, and any food bearing or containing such additive because it is intended solely for investigational use by qualified experts; or

(2) There is in effect, and the additive and its use or intended use are in conformity with a regulation issued under section 409 prescribing the conditions under which such additive may be safely used.

(c) Many chemicals commonly used in foods are generally recognized as safe. A number of them have been listed in regulations in this chapter. However, there are food additives in common use that are not generally recognized as safe and for which tolerances must be established by regulation. It is not possible at this time to determine whether tolerances will be established for them before the food additives amendment will become fully effective. Manufacturers, distributors, users, and food-law enforcement officials need to know the status of these additives under the amendment prior to March 6, 1960, so that they will know whether they may be employed after that date.

(d) The Commissioner of Food and Drugs is prepared to consider requests for an extension of the effective date of the law, for specific additives. The following criteria, among others, will be used in evaluating and acting upon such requests:

(1) The effective date of the amendment can be extended for a specific additive only upon a finding, based on a study of the available facts about the additive and its toxicity, that such extension will involve no undue risks to the public health and that conditions exist that necessitate such extension.

(2) There should be evidence about the amounts of the additive present in the food and about its chronic toxicity before an extension is granted.

(3) Extensions will not be granted for a food additive if appropriate tests show the production of cancer in test animals at any dosage level, nor will they be granted if such tests show alarming symptoms other than cancer in any dosage, unless experimental data show a level of feeding to test animals that is safe to the animal and provide a satisfactory margin of safety for the levels in the human diet.

(4) Where a regulation provides for the presence of an additive in certain foods at a given level, and the other criteria of this statement of policy are met, the effective date may be extended for other similar uses of the additive.

(5) Extension should be granted only for those uses of a food additive which had been employed prior to January 1, 1958.

(6) Notice of the decisions of the Food and Drug Administration on requests for extensions will be published in the FEDERAL REGISTER.

(e) Each request for an extension should be addressed to the Commissioner of Food and Drugs, and should give:

(1) The name and chemical composition of the food additive for which extension is requested.

(2) A statement of the uses of the food additive for which extension is requested and evidence that these uses were recognized prior to January 1, 1958.

(3) Information about the physical or technical effect produced by the additive, and the quantity needed to produce such effect.

(4) Information about the quantity of the additive expected in or to be added to the food.

(5) Available information which indicates that these amounts of the additive in food will not jeopardize the public health.

(6) A statement of the reason(s) why a tolerance has not previously been requested.

(7) In order that decisions on requests for extensions may be published before March 6, 1960, requests and supporting data should be received by February 1, 1960.

(Sec. 701(a), 52 Stat. 1055; 21 U.S.C. 352(a). Interpret or applies secs. 402, 409, 72 Stat. 1785, 1789; note under 21 U.S.C. 342; 21 U.S.C. 348)

Dated: December 23, 1959.

[SEAL] GEO. P. LARRICK,
Commissioner of Food and Drugs.

* * * * *

PROPOSED SUPPLEMENTAL LIST OF FOOD ADDITIVES GENERALLY RECOGNIZED AS SAFE:

A list of food additives or substances generally recognized as safe appeared in an order issued by the U. S. Food and Drug Administration and published in the Federal Register of November 20, 1959. The order became effective on December 20, 1959, under the provisions of the Federal Food, Drug, and Cosmetic Act.

In the February 2, 1960, Federal Register the Agency published a supplemental list of food additives which it proposes to include in the regulation and asked for comments prior to inclusion of the supplemental list in the regulation.

Included in the supplemental list are chemical preservatives, buffers and neutralizing agents, nonnutritive sweeteners, nutrients, stabilizers, anticaking agents, and a group of miscellaneous additives. The supplemental list includes about 52 substances, and for some substances limits are designated.

Also in the February 2 Federal Register, the Agency also amended the food ad-

ditives regulations by adding a list of substances employed in the manufacture of food-packaging materials for which prior sanctions have been granted. Included in that list are certain antioxidants, antimicrobics, driers, drying oils, plasticizers, release agents, stabilizers, and a few others--about 82 substances.

* * * * *

LIST ISSUED OF SPICES, SEASONINGS, ETC., RECOGNIZED AS SAFE:

A list of spices, seasonings, essential oils, oleoresins, and natural extractives that are generally recognized as safe for intended use, within the meaning of section 409 of the Federal Food, Drug, and Cosmetic Act, was published by the U. S. Food and Drug Administration in the January 19, 1960, Federal Register. The order became effective upon publication.

The common name and the botanical name of plant source is given in the list. Included are about 70 spices and other natural seasonings and flavorings (leaves, roots, barks, berries, etc., including pepper, parsley, paprika, etc.); 128 essential oils, oleoresins, and natural extractives, including distillates; and 3 miscellaneous additives.



Treasury Department

COAST GUARD

STANDARDS FOR NUMBERING OF UNDOCUMENTED VESSELS ISSUED:

Certain regulations pertaining to the numbering of undocumented vessels have been issued by the U. S. Coast Guard and published in the December 29, 1959, issue of the Federal Register. They became effective on March 15, 1960. The purpose is to publish procedures with respect to numbering of undocumented vessels under the Federal Boat Act of 1958; to provide for temporary exemptions from numbering requirements in order to allow states which have under active consideration or have nearly perfected their numbering systems additional time in which to obtain approval; and to reduce the fee for an original number from \$5.00 to \$3.00, which is based on the cost for administration of the Coast Guard numbering system.

The Federal Boat Act of 1958 included provisions for establishment of a new system of numbering small undocumented vessels propelled by machinery of 10 or more horsepower, using the navigable waters of the United States. The Act permits the several states to have concurrent jurisdiction with the Federal Government over the navigable waters within their respective boundaries and to enforce their respective laws on all the waters within such boundaries whether they be intrastate waters or navigable waters of the United States. The states can assume the responsibility for numbering undocumented vessels and for the passage and enforcement of laws regarding small boats. If a state does not assume responsibility, U. S. Coast Guard regulations will apply in that state.

The new Coast Guard regulation designated 46 CFR 171.01-6 is to provide a temporary exemption until July 1, 1960, for all undocumented vessels principally used within a particular state in which it is found that such state's system for numbering is under active consideration or nearly perfected for approval and may be approved by July 1, 1960. This temporary exemption may be permitted so that the assumption of functions with re-

spect to numbering by a particular state may be accomplished in an equitable manner.

The new regulation (designated 46 CFR 171.10-2) describes the procedures for making application for a Coast Guard number on and after April 1, 1960. Arrangements have been made with the Post Office so that applications (Forms CG-3876 and CG-3876A) will be available at all First Class and Second Class Post Offices throughout the United States and at designated Third and Fourth Class Post Offices in those states in which the undocumented vessels must be numbered by the Coast Guard. No applications will be accepted before April 1, 1960.

The amendment to 46 CFR 171.10-25 revises the procedures for obtaining a duplicate certificate of number in event the original certificate of number is lost or destroyed. Arrangements have been made with the Post Office so that applications for duplicate certificates of number (Form CG-3919) will be available at all First and Second Class Post Offices throughout the United States and at designated Third and Fourth Class Post Offices in those states in which vessels must be numbered by the Coast Guard. No applications will be accepted before April 1, 1960. No application will be processed without a special fee stamp attached thereto and postmarked.

Thirty states have enacted legislation to set up their own registering and numbering systems but all have not yet been formally approved by the Coast Guard. Additional states probably will act but the Coast Guard will take over the responsibility in those which do not conform on April 1, 1960.

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COURT OF CUSTOMS AND PATENT APPEALS

CONSTITUTIONALITY OF TRADE AGREEMENTS ACT UPHELD:

The U. S. Court of Customs and Patent Appeals on December 16, 1959, issued a ruling upholding dismissal of the suit by a West Coast tuna canning firm, which sought to have the Trade Agreements Act declared unconstitutional.

The five-judge court unanimously upheld the decision of the U. S. Customs Court, which had dismissed the firm's suit.

The tuna canning firm had asked that tariff reductions negotiated with other countries under the Act be declared null and void because the Act amounted to an unconstitutional delegation of legislative powers by the Congress to the President, and because the tariff-cutting agreement actually was a treaty with a foreign nation which should have been ratified by the Senate.

The Court, in an opinion by Judge I. Jack Martin, rejected both arguments. It cited Supreme Court decisions which it said approved Congressional delegation powers which are limited and which indicate the intent of Congress.

The Court held that in the 1934 Act "the Congressional policy is pronounced very clearly. The stated objectives are to expand foreign markets for the products of the United States. . . ."

The Court said: "These objectives are in their nature no different than those" of the Tariff Acts of 1890 and 1922 which the high court has upheld.

Decisions of the Customs and Patent Court can be appealed to the Supreme Court.



Eighty-Sixth Congress (Second Session)

Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions, hearings, and other chamber actions by the House and Senate, as well as signature into law or other final disposition are covered.



AMERICAN SAMOA PROBLEMS: Senator Bartlett introduced into the Congressional Record of January 13, 1960, an article written by Senator Long of Hawaii on problems in American Samoa. The article mentions that assistance is needed in developing a more adequate economy in American Samoa. Enlargement is needed of the present fish cannery which employs 450 people. One of the greatest needs is for financial assistance in providing fishing vessels capable of competing with vessels used by other fishermen in American Samoa waters. The article further states that the Bureau of Commercial Fisheries should provide assistance in a future aid program to American Samoa.

COLOR ADDITIVES IN FOODS: The House Committee on Interstate and Foreign Commerce held hearings February 10 and 11 on H. R. 7624 (Harris) and S. 2197 (Hill & Goldwater), color additive amendments to the Food and Drug Act.

FISHERIES ASSISTANCE ACT OF 1959: House disagreed to certain Senate amendments to H. R. 5421 (MacDonald)--passed House August 26, 1959, and passed and amended in Senate September 11, 1959--to provide a program of assistance to correct inequities in the construction of fishing vessels and to enable the fishing industry of the United States to regain a favorable economic status, and for other purposes. Conference on the bill was requested with the Senate and House and Senate conferees were appointed.

IMPORTED COMMODITY LABELING: The House on February 2, 1960, passed by a voice vote H. R. 5054 (Herlong), a bill to amend the Tariff Act of 1930 with respect to the marking of imported articles and containers, as amended. Provides that imported articles removed from original container, repacked, and offered for sale in a new package or container, shall be marked to show the country of origin. Bill referred to the Senate, where no companion bill has been introduced to date.

INCOME TAX LAW REVISION IN FAVOR OF FISHERMEN: H. R. 10305 (Wilson), a bill to extend to fishermen the same treatment afforded farmers in relation to estimated income tax; to the Committee on Ways and Means; introduced in House February 9, 1960. Similar to H. R. 604 (Pelly), H. R. 1925 (King of Calif.), and S. 774 (Magnuson); all introduced during first session of the 86th Congress.

INTERIOR APPROPRIATIONS: H. R. 10401 (Kirwan), a bill making appropriations for the Department of Interior and related agencies for the fiscal year ending June 30, 1961, and for other purposes; filed on February 12, 1960 (H. Rept. 1264). The House passed the bill by a voice vote on February 16, 1960. Included in the bill is an increase of \$4,090,800 for the Fish and Wildlife Service, primarily to replace permanent appropriations from receipts, including duck stamps, which will no longer be available for operations, enforcement, or research.

Department of the Interior and Related Agencies Appropriations for 1961, Part I (Hearings January 12, 13, 14, 26, 27, and 28, 1960, before a Subcommittee of the Committee on Appropriations, House of Representatives, 86th Congress, 2nd Session, on

appropriations for the Department of Interior except Bonneville Power Administration, Bureau of Reclamation, Southeastern Power Administration, and Southwestern Power Administration), 1027 pp., printed. Includes hearings on operations of the Fish and Wildlife Service and also specifically the Bureau of Commercial Fisheries.

Department of the Interior and Related Agencies Appropriations for 1961, Part II (Hearings January 21, 22, and 25, 1960, before a Subcommittee of the Committee on Appropriations, House of Representatives, 86th Congress, 2nd Session, on appropriations for several related agencies of the Department of the Interior, including the Outdoor Recreation Resources Review Commission, Smithsonian Institution, and Transitional Grants to Alaska), 517 pp., printed.

LAW OF THE SEA: Public hearings were held by the Senate Committee on Foreign Relations on January 20, 1960, at 10:30 a.m. in the New Senate Office Building, Washington, D. C., on four conventions and an optional protocol on the Law of the Sea: Executive J, "A Convention on the Territorial Sea and Contiguous Zone;" Executive K, "A Convention on the High Seas;" Executive L, "A Convention on Fishing and Conservation of the Living Resources of the High Seas;" Executive M, "A Convention on the Continental Shelf;" Executive N, "An Optional Protocol of Signature Concerning the Compulsory Settlement of Disputes."

FISH AND WILDLIFE: Miscellaneous Fish and Wildlife Legislation (Hearings May 5, June 3, 30, July 1, and August 4, 1959, before the Subcommittee on Fisheries and Wildlife Conservation of the Committee on Merchant Marine and Fisheries, United States House of Representatives, 86th Congress, 1st Session, on H. R. 350, H. R. 1984, H. R. 2398, H. R. 2565, H. R. 3087, H. R. 4019, H. R. 4402, H. R. 5004, H. R. 5119, H. R. 5271, H. R. 5813, H. R. 5814, H. R. 5954, H. R. 7045, and H. R. 7455), 301 pp., printed. Contains purpose and provisions of each bill, and statements, reports, and recommendations of representatives of Government and industry. Also includes individual views and comments on bills, and various statistical tables.

Of special interest to commercial fisheries are the hearings on H. R. 4402, a bill to provide for the construction of a salt-water research laboratory at Seattle, Wash.; H. R. 350, a bill to provide for the construction of a fish and wildlife marine laboratory and experiment station in the central Gulf coast area of Florida; H. R. 5954, a bill to clarify a provision in the Black Bass Act relating to the interstate transportation of fish and for other purposes; and H. R. 1984, H. R. 3087, H. R. 4019, H. R. 5119, and H. R. 5271, all providing for the eradication of starfish in Long Island Sound and adjacent waters.

OCEANOGRAPHIC SURVEYS: H. R. 10412 (G. P. Miller), a bill to establish a public policy with respect to oceanographic surveys, and to provide for coordination of the efforts of Federal agencies with respect to oceanographic surveys; to the Committee on Merchant Marine and Fisheries; introduced in House February 15, 1960.

SHRIMP CONSERVATION CONVENTION WITH CUBA: H. R. 9917 (Bonner), a bill to give effect to the Convention between the United States and Cuba for the conservation of shrimp, signed at Havana, August 15, 1958; to the Committee on Merchant Marine and Fisheries; introduced in House January 26, 1960.

Identical to S. 2867 (Magnuson), referred to the Committee on Interstate and Foreign Commerce; introduced in Senate January 20, 1960.

SHRIMP IMPORTS: H. Res. 442 (Boggs), a resolution directing the Tariff Commission to make an investigation of the effect of the existing customs treatment of shrimp upon the domestic shrimp industry; to the Committee on Ways and Means; introduced in House February 8, 1960.

The House Committee on Ways and Means announced on February 9 its approval of a Committee resolution directing the Tariff Commission to make an investigation of the effect of the existing customs treatment of shrimp upon the domestic shrimp industry. The Committee resolution is identical to H. Res. 442.

TARIFF NEGOTIATIONS: H. Con. Res. 503 (Thomson), concurrent resolution expressing the sense of Congress that the United States should not grant further tariff reductions in the forthcoming tariff negotiations under the provisions of the Trade Agreements Extension Act of 1958, and for other purposes; to the Committee on Ways and Means; introduced in House January 25, 1960. Identical to H. Con. Res. 512 (Bailey), H. Con. Res. 513 (Berry), H. Con. Res. 515 (Dent), H. Con. Res. 516 (Dorn of S. C.), H. Con. Res. 517 (Fisher), H. Con. Res. 518 (Gross), H. Con. Res. 519 (Hemphill), H. Con. Res. 520 (McIntire), H. Con. Res. 521 (Mason), H. Con. Res. 522 (Oliver), H. Con. Res. 523 (Smith of Kan.), H. Con. Res. 524 (Stratton), and H. Con. Res. 525 (Utt); all introduced in House January 26, 1960. Also identical to H. Con. Res. 527 (Mack of Wash.), introduced January 27; H. Con. Res. 554 (Saylor), introduced February 1; H. Con. Res. 560 (Tollerson), introduced February 2; H. Con. Res. 580, introduced February 4; and H. Con. Res. 583 (Hays), introduced in House February 8, 1960.

TRANSPORTATION: S. 3048 (Magnuson), a bill to amend the Interstate Commerce Act with respect to reasonable differentials in favor of joint rates for through transportation by rail and water, and for other purposes; to the Committee on Interstate and Foreign Commerce; introduced in Senate February 16, 1960.

VESSELS ADMEASUREMENT SIMPLIFICATION: S. 2916 (Magnuson), a bill to simplify the admeasurement of small vessels; to the Committee on Interstate and Foreign Commerce; introduced in Senate January 26, 1960.

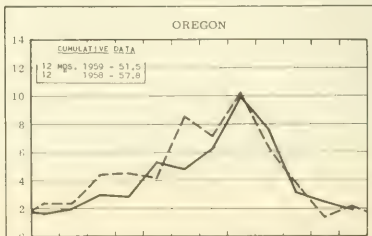
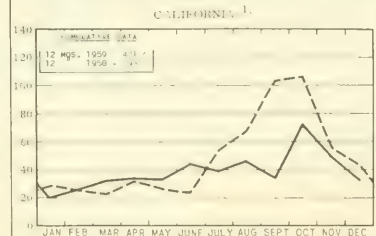
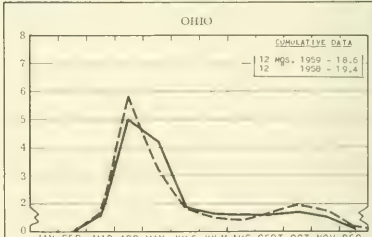
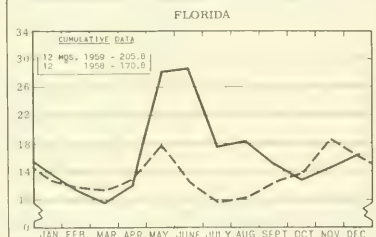
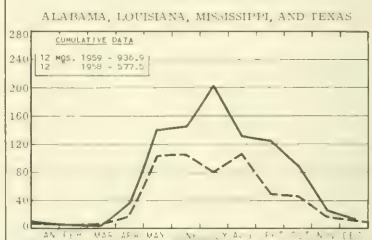
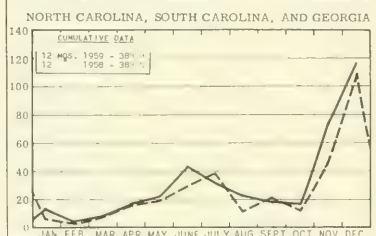
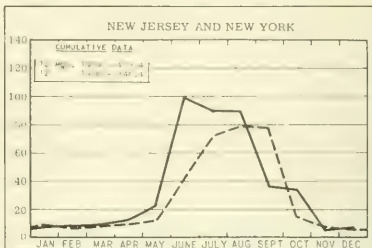
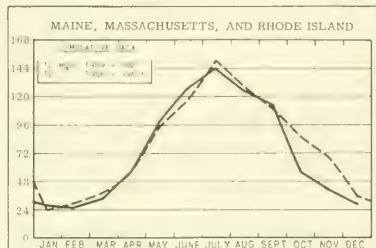
Also identical bill H. R. 9916 (Bonner); to the Committee on Merchant Marine and Fisheries; introduced in House January 26, 1960.





CHART 1 - FISHERY LANDINGS for SELECTED STATES

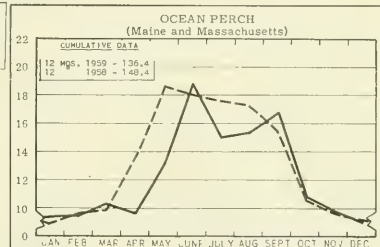
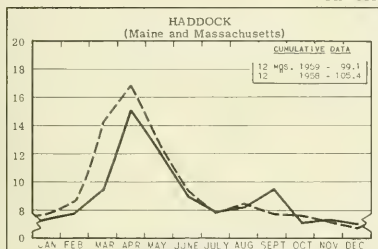
In Millions of Pounds



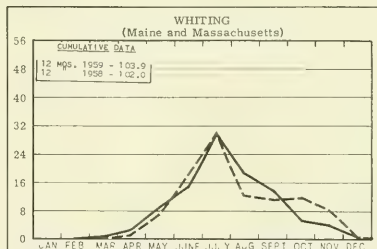
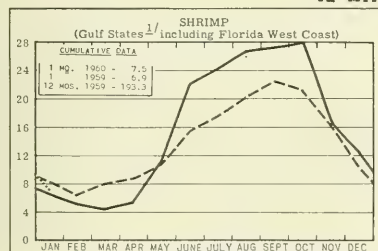
1/ONLY PARTIAL--INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH LANDINGS AT PRINCIPAL PORTS.

CHART 2 - LANDINGS for SELECTED FISHERIES

In Millions of Pounds

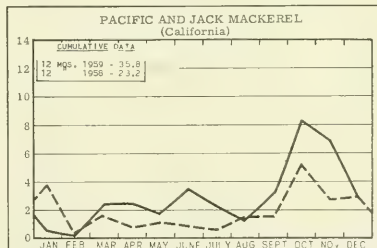
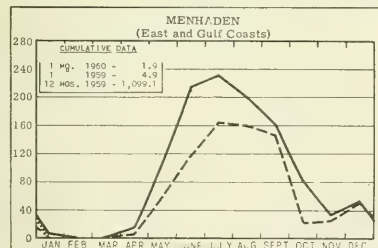


In Millions of Pounds



^{1/2}LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

In Thousands of Tons



In Thousands of Tons

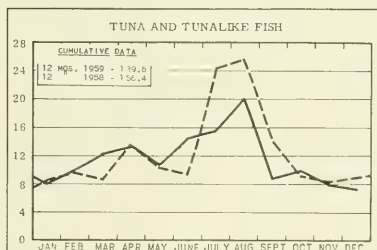
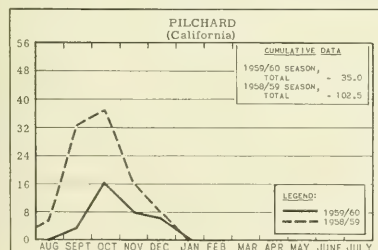
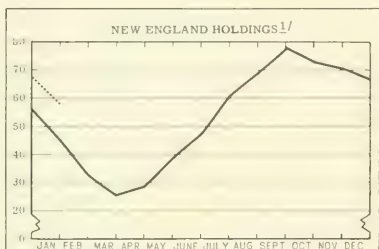
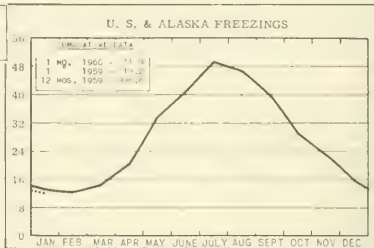
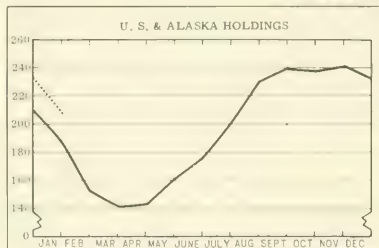
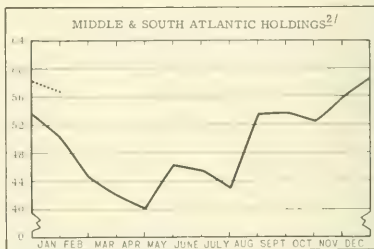


CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

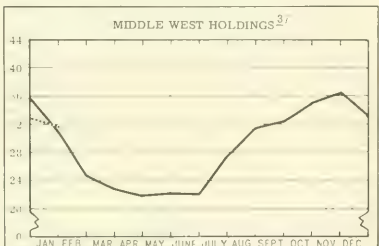
In Millions of Pounds



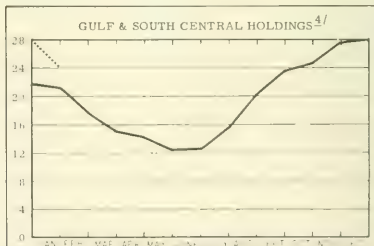
^{1/}MAINE, MASSACHUSETTS, RHODE ISLAND, AND CONNECTICUT



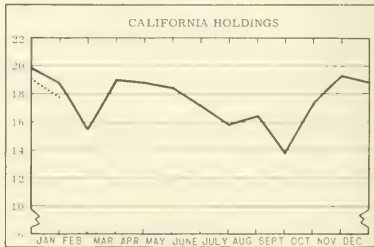
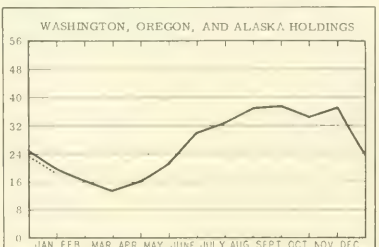
^{2/}ALL EAST COAST STATES FROM N. Y. SOUTH.



^{3/}OHIO, IND., ILL., MICH., WIS., MINN., IOWA, MO., N. DAK., NEBR., & KANS.



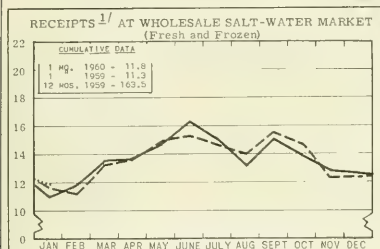
^{4/}ALA., MISS., LA., TEX., ARK., OK., & TENN.



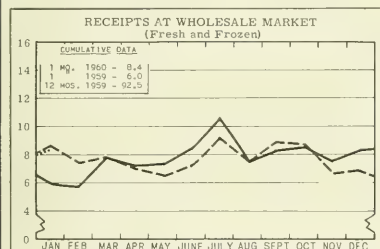
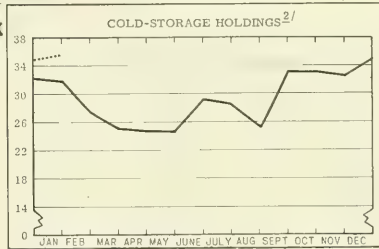
* Excludes salted, cured, and smoked products.

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

In Millions of Pounds



NEW YORK CITY



CHICAGO

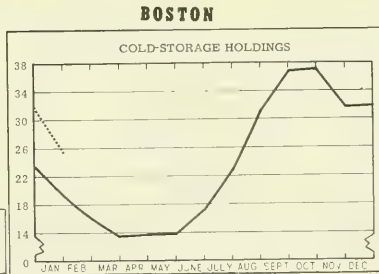
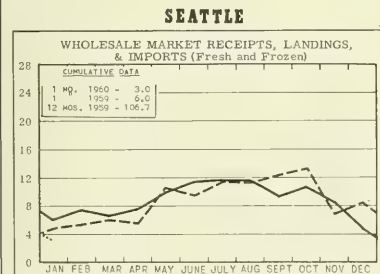
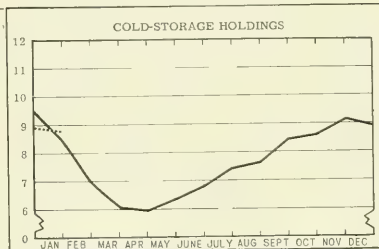


CHART 5 - FISH MEAL and OIL PRODUCTION - U.S. and ALASKA

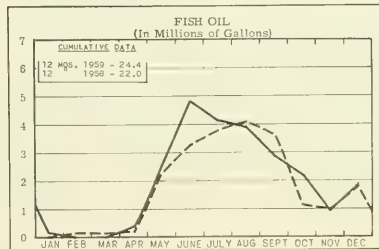
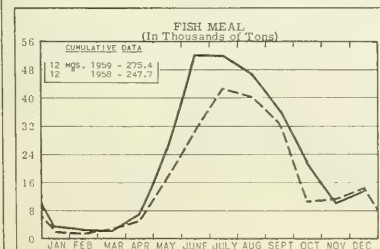
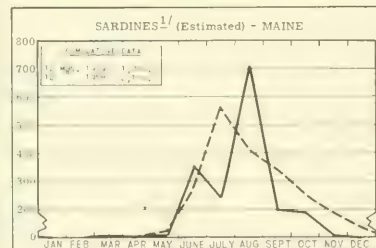
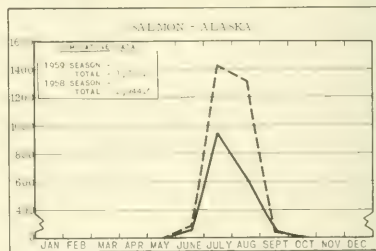
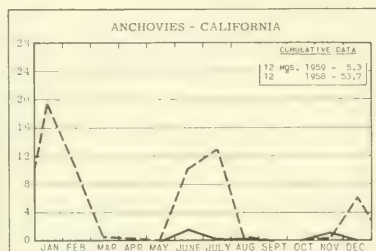
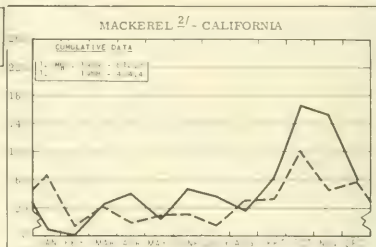
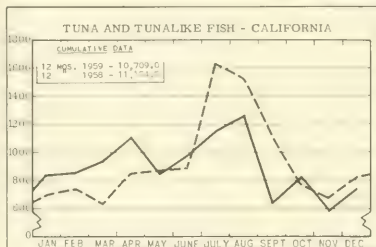


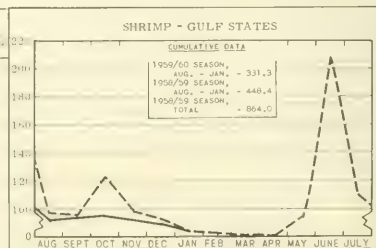
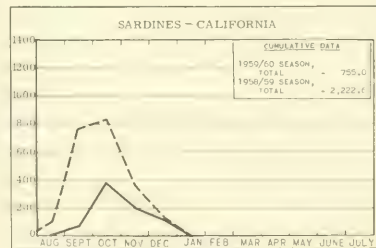
CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

In Thousands of Standard Cases



STANDARD CASES

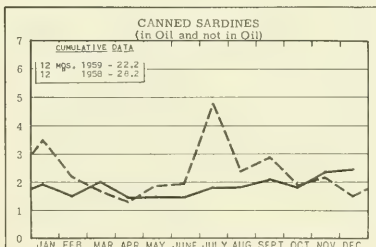
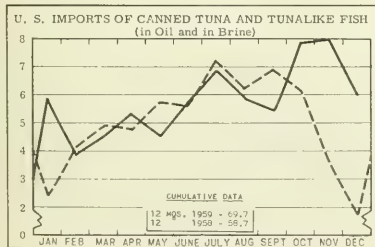
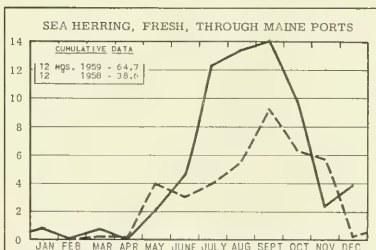
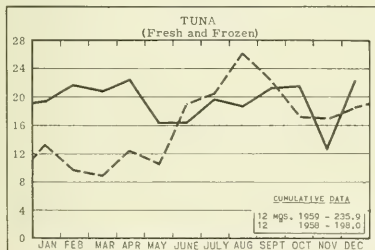
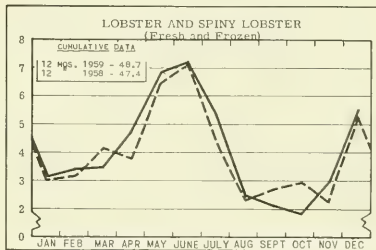
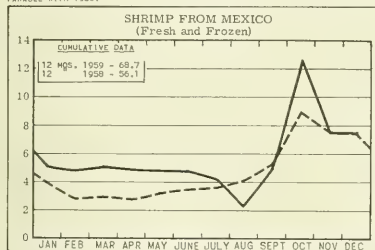
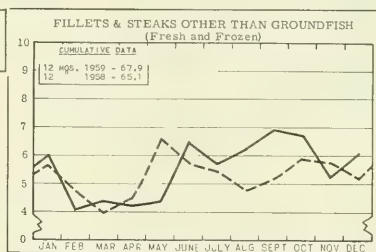
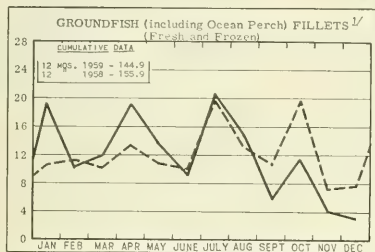
Variety	No. Cans	Designation	Net Wgt.
SARDINES....	100	1/2 drawn	3 1/2 oz.
SHRIMP . . .	48	--	5 oz.
TUNA . . .	48	# 1/2 tuna	6 & 7 oz.
PILCHARDS...	48	# 1 oval	15 oz.
SALMON . . .	48	1-lb. tall	16 oz.
ANCHOVIES...	48	1/2-lb.	8 oz.

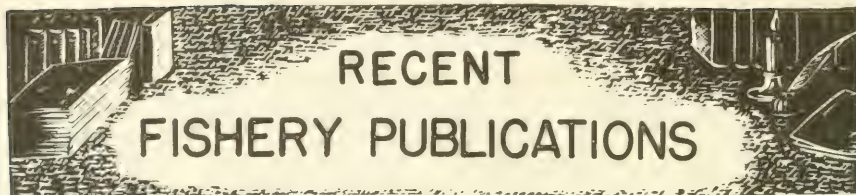


1/2 INCLUDING SEA HERRING.

CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds





RECENT FISHERY PUBLICATIONS

FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

- CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA;
 FL - FISHERY LEAFLETS;
 SL - BRANCH OF STATISTICS LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS;
 SSR - FISH. - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).
 SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

- | Number | Title |
|----------|--|
| CFS-2155 | Mississippi Landings, August 1959, 2 pp. |
| CFS-2171 | Fish Meal and Oil, October 1959, 2 pp. |
| CFS-2174 | Massachusetts Landings, September 1959, 5 pp. |
| CFS-2176 | Mississippi Landings, September 1959, 2 pp. |
| CFS-2182 | Alabama Landings, September 1959, 2 pp. |
| CFS-2183 | Georgia Landings, October 1959, 2 pp. |
| CFS-2186 | Florida Landings, October 1959, 6 pp. |
| CFS-2188 | Maine Landings, October 1959, 3 pp. |
| CFS-2189 | New York Landings, October 1959, 4 pp. |
| CFS-2190 | Texas Landings, October 1959, 3 pp. |
| CFS-2198 | North Carolina Landings, November 1959, 4 pp. |
| CFS-2200 | Ohio Landings, October 1959, 2 pp. |
| CFS-2201 | New Jersey Landings, November 1959, 3 pp. |
| CFS-2205 | Pacific Coast States Fisheries, 1958 Annual Summary, 6 pp. |
| CFS-2206 | South Carolina Landings, November 1959, 2 pp. |
| CFS-2207 | Georgia Landings, November 1959, 2 pp. |
| CFS-2209 | Frozen Fish Report, November 1959, 8 pp. |
| CFS-2210 | Fisheries of the United States and Alaska, 1958 Annual Summary, 15 pp. |
| CFS-2211 | Rhode Island Landings, October 1959, 3 pp. |
| CFS-2216 | Florida Landings, November 1959, 6 pp. |
| CFS-2218 | Ohio Landings, November 1959, 2 pp. |
| CFS-2219 | Rhode Island Landings, November 1959, 3 pp. |
| FL-471 | Edible Crabs, by Charles H. Walburg, 4 pp., illus., 1959 (Revision of FL-71, July 1945). |
| FL-487 | Spiny Lobster Gear and Fishing Methods, by C. E. Cope, 20 pp., illus., June 1959. Describes the spiny lobster fishery in the Florida |

area. Includes details of boats and deck fittings used, current gear and methods, former gear and methods, and approximate costs of spiny lobster gear (1959). Some excellent drawings accompany the text.

- SL-107 - Firms Canning Fish and Shellfish Specialties, 1958 (Revised), 5 pp.
- SL-162 - Firms Producing Fish Sticks and Portions, 1959 (Revised), 2 pp.
- SSR-Fish. No. 289 - Counts of Red Tide Organisms, *Gymnodinium breve*, and Associated Oceanographic Data from Florida West Coast, 1954-57, by John H. Finucane and Alexander Gradovich, 224 pp., illus., March 1959.
- SSR-Fish. No. 297 - Lake Superior Limnological Data, 1951-57, by Alfred M. Beeton, James H. Johnson, and Stanford H. Smith, 183 pp., illus., April 1959.
- SSR-Fish. No. 305 - Stream Catalog of Eastern Section of Ketchikan Management District of Southeastern Alaska, by John Wilson Martin, 398 pp., illus., April 1959. Stream descriptions, maps, historical records, and salmon escapement data are compiled for 117 salmon streams in the eastern section of the Ketchikan fishery management district. Each stream is located geographically by latitude and longitude, and by orientation to prominent land masses. The species of salmon utilizing the spawning grounds and estimates of the escapement magnitude each year for many years are given.
- SSR-Fish. No. 306 - Reclamation of Indian and Abrams Creeks in Great Smoky Mountains National Park, by Robert E. Lennon and Phillip S. Parker, 26 pp., illus., May 1959.
- SSR-Fish. No. 311 - Bristol Bay Oceanography, August-September 1938, by Felix Favorite and Glenn Pedersen, 35 pp., illus., August 1959.
- SSR-Fish. No. 316 - Lethal Doses of Several Commercial Chemicals for Fingerling Channel Catfish, by Howard P. Clemens and Kermit E. Sneed, 11 pp., September 1959.
- SSR-Fish. No. 317 - Age Size Composition of the Menhaden Catch Along the Atlantic Coast of the United States, 1952-55 (with a Brief Review of the Commercial Fishery), by Fred C. June and John W. Reintjes, 70 pp., illus., August 1959. Includes a brief description of menhaden purse-seine fishing gear, methods, and seasons; a summary of the major features of the 1955 Atlantic Coast purse-seine fishery; a description and analysis of the methods of sampling the catches; and tabular data resulting from the catch-sampling program.

SSR-Fish. No. 319 - Effect of Field Polarity in Guiding Salmon Fingerlings by Electricity, by H. William Newman, 18 pp., illus., September 1959.

Sep. No. 578 - The Pound-Net Fishery in Virginia: Part 2 - Species Composition of Landings Reported as Menhaden.

Sep. No. 579 - Possibilities for Applying Fish Oil to Ore Flotation.

Sep. No. 580 - Research in Service Laboratories (February 1960): Contains these articles-- "Composition of Fish and Shellfish;" "Control of Drip in Chilled and Frozen Fishery Products;" "Fish Flour Research;" "Low Storage Temperatures Help Maintain Fillet Quality;" "Proposed Standards for Grades of Frozen Raw Headless Shrimp under Review;" and "Purified Fish-Oil Fractions to be made Available for Research."

THE FOLLOWING MARKET NEWS LEAFLETS ARE AVAILABLE FROM THE BRANCH OF MARKET NEWS, BUREAU OF COMMERCIAL FISHERIES, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C.

Number	Title
MNL-4	Newfoundland's Fishing Industry, 20 pp.
MNL-5	Danish Fisheries, 1959, 12 pp.
MNL-6	Mexico's Fish and Shellfish Canning Industry, 1958, 23 pp.

THE FOLLOWING ENGLISH TRANSLATIONS OF FOREIGN LANGUAGE ARTICLES ARE NOT FOR GENERAL DISTRIBUTION BUT ARE AVAILABLE FOR REFERENCE ONLY FROM THE U. S. FISH AND WILDLIFE SERVICE, BUREAU OF COMMERCIAL FISHERIES, P. O. BOX 3830, HONOLULU, HAWAII.

Attempts at Estimating the Abundance of Fish Population from the Data of Tuna Long-Line Fishery. I--A Few Considerations on the Variations in Distribution of Catch per 1,000 Hooks, by Akira Suda, English translation, 15 pp., processed. (Translated from Report of Nankai Regional Fisheries Research Laboratory, no. 7, 1958, pp. 105-126.)

Comparison Between Survey Map by 14.5 Kc. Fish-Finder and That by 200 Kc. Fish-Finder with Sharp Beam on Same Area, by Tomiju Hashimoto and Yoshinobu Maniwa, English translation, 5 pp., processed. (Translated from Technical Report of Fishing Boat, no. 12, October 1958, pp. 149-155.)

The Daily Vertical Migration of Pelagic Fish, by S. G. Zussner, English translation, 32 pp., processed. (Translated from Behavior of Fish and Commercial Exploration, V.N.I.R.O., Trudy v. 36, pp. 83-105.)

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED:

California Fishery Products Monthly Summary, November 1959; 13 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) California cannery receipts of tuna and tunalike fish, mackerel, anchovies, and sardines; pack of canned tuna, mackerel, anchovies, and sardines; market fish receipts at San Pedro, Santa Monica, and Eureka

areas; California imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; American Tuna Boat Association auction sales; for the month indicated.

Gulf Monthly Landings, Production, and Shipments of Fishery Products, November and December, 1959, 6 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; sponge sales; and imports at Port Isabel and Brownsville, Tex.; for the months indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, December 1959, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 So. King St., Hampton, Va.) Fishery landings and production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.

New England Fisheries--Monthly Summary, November 1959, 24 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Reviews the principal New England fishery ports, and presents food fish landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, Provincetown, and Woods Hole), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and landings and ex-vessel prices for fares landed at the Boston Fish Pier and sold through the New England Fish Exchange; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly Summary for October 1959, 23 pp. (Market News Service, 155 John St., New York 38, N. Y.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, imports entered at New York City, primary wholesaler prices for frozen products, and marketing trends; for the month indicated.

(Seattle) Washington, Oregon, and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, November and December 1959, 8 and 9 pp., respectively. (Market News Service, U. S. Fish and Wildlife Service, Pier 42 South, Seattle 4, Wash.) Includes landings and local receipts, with ex-vessel and wholesale prices in some instances, as reported by Seattle and Astoria (Ore.), wholesale dealers; also Northwest Pacific halibut landings; and Washington shrimp landings; for the months indicated.

Federal Administration of the Fishery Industries of Alaska, by C. Howard Baltzo, 11 pp., November 1959, (U. S. Fish and Wildlife Service, Bureau of Commercial Fisheries, Box 2481, Juneau, Alaska.) A term-end report on Alaska's commercial fisheries and the accomplishments of the U. S. Bureau of Commercial Fisheries in their development. Covers the historical background of the Alaska fisheries; the development of the salmon, halibut, sablefish, herring, clam, shrimp, and crab industries; and latent fisheries such as bottomfish, cod, oysters, and whaling. Discusses the historical role of Government administration in the Alaska fisheries and functions such as fishery research, river basin studies, technology, exploratory fishing, and vessel loans. Since Alaska has now achieved Statehood, the responsibility for control and regulation of the fishery conservation program was assumed by the Alaska Department of Fish and Game at Juneau on January 1, 1960.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Changes in Tuna Landings of the Hawaiian Long-line Fishery, 1948-1956, by Richard S. Shomura, Fishery Bulletin 160 (from Fishery Bulletin of the Fish and Wildlife Service, vol. 60), pp. 87-106, illus., printed, 20 cents, 1959. This study was undertaken to determine the cause of a change in species dominance in the catch of the Hawaiian long-line fishery from yellowfin to big-eyed tuna during the period 1948-49. The available commercial catch records showed that the reversal in species resulted from a shift by the larger vessels of the fleet from fishing grounds in the leeward waters of the northern islands to grounds located in the windward waters of the southern islands.

Contributions of Hudson and Connecticut Rivers to New York-New Jersey Shad Catch of 1956, by Kenneth J. Fischler, Fishery Bulletin 163 (from Fishery Bulletin of the Fish and Wildlife Service, vol. 60), pp. 161-174, illus., printed, 20 cents, 1959.

Early Development and Metamorphosis of the Ten-Pounder, *ELOPS SAURUS* Linnaeus, by Jack W. Gehring, Fishery Bulletin 155 (from Fishery Bulletin of the Fish and Wildlife Service, vol. 59), pp. 619-647, illus., printed, 30 cents, 1959.

"Experimental Introductions of Fresh-Water Alewives," by Robert E. Vincent, article, *The Progressive Fish-Culturist*, vol. 22, no. 1, January 1960, pp. 38-42, processed, single copy 25 cents.

Food of the Pacific Sardine (*SARDINOPS CAE-RULEA*), by Cadet H. Hand and Leo Berner, Jr., Fishery Bulletin 164 (from Fishery Bulletin of the Fish and Wildlife Service, vol. 60), pp. 175-184, illus., printed, 15 cents, 1959.

The Goldeye, *AMPHIODON ALOSOIDES* (Rafinesque), in the Commercial Fishery of the Red Lakes, Minnesota, by Marvin D. Grosslein and Lloyd L. Smith, Jr., Fishery Bulletin 157 (from Fishery Bulletin of the Fish and Wildlife Service, vol. 60), pp. 33-41, illus., printed, 15 cents, 1959.

"Improvements in a Microprojector for Fish Scales," by Elmer S. Phillips and Dwight A. Webster, article, *The Progressive Fish-Culturist*, vol. 22, no. 1, January 1960, pp. 24-29, illus., processed, single copy 25 cents.

Variability of Skipjack Response to Live Bait, by Heeny S. H. Yuen, Fishery Bulletin 162 (from Fishery Bulletin of the Fish and Wildlife Service, vol. 60), pp. 147-160, illus., printed, 20 cents, 1959. In this study, observations made from commercial skipjack live-bait fishing boats, operating from Honolulu, revealed that catch rates for each school of skipjack had a general pattern; the rates rose to a peak and then declined with elapsed fishing time. Peak catch rate and duration of fishing after the peak were selected as measures of biting response and were compared with data on location, the weather, time of day, and stomach contents. Large skipjack feeding on fast-swimming fish seemed to show a better response to chum (live bait) than did those feeding on slow-swimming fish.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. FOR INFORMATION REGARDING PUBLICATIONS THAT FOLLOW, SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ALGAE:

Notes on Algae of Quebec, by Lewis H. Flint, Bulletin No. 19, printed, Service de Biogéographie, University of Montreal, Montreal, Canada.

AMINO ACIDS:

"The Free Amino-Acids of Fish. II--Fresh Skeletal Muscle from Lemon Sole (*Pleuronectes microcephalus*)," by N. R. Jones, article, *Journal of the Science of Food and Agriculture*, vol. 10, May 1959, pp. 282-286, printed. The Society of Chemical Industry, 14 Belgrave Square, London S. W. 1, England.

ANIMAL FEED:

Animal Feed from Herring Waste, by Friedrich Jahn, East German Patent No. 11,819, June 23, 1958. Patent Office, German Democratic Republic, East Berlin, Germany.

ANTIBIOTICS:

"K Metodike Prigotovlenia Biomitsinovogo L'da" (Method of Preparing Biomycin Ice), by E. A. Smotrieva, article, *Rybnoe Khoziaistvo*, no. 3, March 1958, pp. 53-56, printed in Russian. Rybnoe Khoziaistvo, Four Continent Book Corporation, 822 Broadway, New York 3, N. Y. To obtain uniform distribution of antibiotics in ice, tests have been conducted with biomycin (similar to aureomycin) prepared in U.S.S.R. Antibiotic ice can be prepared in blocks and flakes. Flake ice is more convenient to use, for in quick freezing of a thin layer of water the antibiotic is more uniformly distributed. In unequal distribution of the antibiotic, small doses of it, found in individual sections of the block, stimulate the action of microflora instead of suppressing

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it. In this work, agaroid was used to aid uniform distribution of biomycin.

"A New Fluorometric Determination of Chlorotetracycline in Ice, by Tetuo Tomiyama and Yasuo Yone, article, *Food Technology*, vol. 13, July 1959, pp. 370-373, printed. Food Technology, The Garrard Press, 510 North Hickory, Champaign, Ill.

"Opyt Primeneniia Biomitsina Dlia Sokhraneniia Svezhego Ryby" (Test on the Application of Biomyacin for Preserving Fresh Fish), by E. A. Smotrialeva and others, article, *Rybnoe Khozjaistvo*, no. 12, December 1958, pp. 49-51, printed in Russian. Rybnoe Khozjaistvo, Four Continent Book Corporation, 822 Broadway, New York 3, N. Y. During 1956-1957 tests were carried out on the application of biomyacin in preserving fresh sprats and cod. Sprats were immersed in an aqueous solution of biomyacin, 50 mg./liter concentration and preliminary-cooled to 0° C. The fish was removed from the bath after 5 minutes and covered with crushed biomyacin ice. A second group of fish, cooled in ice water and overspread with ordinary ice, served as control. After ice melted, the fish was kept at +5° C. Microbiological analysis, after 8-day storage, showed that titration in culture of test fish was a million times less than in control fish. Also, that nitrogen content of volatiles in the test fish was half of that in the controlled.

BIOCHEMISTRY:

"Determination of Trimethylamine Oxide in Fish Muscle," by J. Bystedt, L. Swenne, and H. Q. Aas, article, *Journal of the Science of Food and Agriculture*, vol. 10, June 1959, pp. 301-304, printed. The Society of Chemical Industry, 14 Belgrave Square, London S. W. 1, England.

BIOLOGICAL RESEARCH:

"Effect of Unsaturated Acids and Fish Oils on Plasma and Tissue Lipides from Hypercholesteremic Rats," by James J. Peifer and W. O. Lundberg, article, *Federation Proceedings*, vol. 18, part I, March 1959, p. 300, printed. Federation of American Societies for Experimental Biology, 9650 Wisconsin Ave., N. W., Bethesda, Md.

CALIFORNIA:

Sportfishing Regulations and Law Digest, 1959, 31 pp., illus., printed. California Department of Fish and Game, 722 Capitol Ave., Sacramento, Calif.

CANADA:

The Canadian Fish Culturist, no. 25, October 1959, 59 pp., illus., printed. The Queen's Printer and Controller of Stationery, Ottawa, Canada. Contains the following articles: "The Effect on Fisheries of Man-Made Changes in Fresh Water in the Maritime Provinces," by A. L. Pritchard; "The Effects on Fisheries of Man-Made Changes in Fresh Water in the Province of Quebec," by Vadim D. Vladkyov; "The Effects of Power, Irrigation, and Stock Water Developments on the Fisheries of the South Saskatchewan River," by R. M. Miller and M. J. Paetz; and "The Effects on Freshwater Fisheries of Man-Made Activities in British Co-

lumbia," by P. A. Larkin and others. The above papers were presented at a symposium on "The Effects on Fisheries of Man-Made Changes in Fresh Waters," held during the eleventh meeting of the Canadian Committee on Fresh Water Fisheries Research, sponsored by the Fisheries Research Board of Canada in association with the annual meeting of the Board, January 3, 1958.

"Survey of Saskatchewan Fisheries," by J. E. Steen, article, *Trade News*, vol. 12, no. 5, November 1959, pp. 3-5, illus., processed. Director of Information and Educational Service, Department of Fisheries, Ottawa, Canada. A detailed discussion of the fisheries of Saskatchewan, the third largest fresh-water fishery in Canada. In 1958, more than 11 million pounds of fish, with a record market value of C\$2 million, were landed in the waters of this western province. According to the author, the accelerated demand for fish in the United States is chiefly responsible for the increase in production in recent years. About 75 percent of Saskatchewan's catch is exported to the U. S. --only about 10 percent is consumed locally and the remainder is sold to other Canadian markets. Nearly 135 lakes in the province are fished commercially, with whitefish the principal species landed. Problems of transportation have been the chief difficulty in marketing the province's fish. Shipping by air in recent years has helped to solve these problems. The province's fisheries are administered by the Fisheries Branch of the Saskatchewan Department of Natural Resources. The Branch has aided the industry by such work as encouraging the development of minn ranches near lakes, control of carp, and the introduction of new and more commercially-valuable species into provincial waters.

CHILE:

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Informaciones Estadísticas sobre Pesca, Años 1955, 1956, 1957 (Statistical Data on Fisheries, Years 1955, 1956, 1957), 67 pp., illus., processed in Spanish. Ministerio de Agricultura, Direccion General de Produccion Agraria y Pesquera, Departamento de Fomento de Pesca y Caza, Valparaiso, Chile.

"El Langostino Chileno" (The Chilean Langostino), by Eida Fagetti G., article, *Boletín Informativo del Departamento de Fomento de Pesca y Caza*, no. 69, May 1959, pp. 10-12, processed in Spanish. Ministerio de Agricultura, Direccion General de Produccion Agraria y Pesquera, Departamento de Fomento de Pesca y Caza, Valparaiso, Chile.

Reglamento del Decreto con Fuerza de Ley No. 34 de 12 de Marzo de 1931 sobre Pesca; Decreto

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No. 1584 de 30 de Abril de 1934 (Rules and Regulations of the Decree with Force of Law No. 34 of March 12, 1931 on Fishing; Decree No. 1584 of April 30, 1934), 27 pp., processed in Spanish. Ministerio de Agricultura, Direccion General de Produccion Agraria y Pesquera, Departamento de Fomento de Pesca y Caza, Valparaiso, Chile.

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Vedas y Otras Disposiciones Referentes a Pesca y Caza (Seasons and Other Requirements Pertaining to Fishing and Hunting), 15 pp., illus., printed in Spanish. Ministerio de Agricultura, Direccion General de Produccion Agraria y Pesquera, Valparaiso, Chile. Instructions for officials responsible for enforcing the laws and regulations of fishing and hunting.

COD:

"Noruega y las Grandes Pesquerias de Bacalao" (Norway and the Great Cod Fisheries), article, *Boletin Informativo del Departamento de Fomento de Pesca y Caza* (Information Bulletin of the Department of Fish and Game Development), no. 69, May 1959, pp. 4-7, processed in Spanish. Ministerio de Agricultura, Direccion General de Produccion Agraria y Pesquera, Departamento de Fomento de Pesca y Caza, Valparaiso, Chile.

Recent Studies of Decomposition in Frozen Raw Cod (Lecture delivered at the Annual Meeting of the Inspection and Consumer Service, Department of Fisheries, Ottawa, Canada, November 3-7, 1958), by L. M. Beacham. Department of Fisheries, Ottawa, Canada.

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Canadian Fish Cook Book, 97 pp., illus., printed, C\$1. Queen's Printer and Controller of Stationery, Ottawa, Canada, 1959. A handbook published by the Ministry of Fisheries on how to buy, prepare, and serve all kinds of Canadian fish and shellfish at every season of the year. Includes instructions on storing fish in the home and preparing it for cooking. Also contains a variety of recipes for baking fish both whole and in fillets and steaks, oven steaming, broiling, panfrying, deep fat frying, cooking in water, and cooking in milk. Presents instructions for preparing shellfish, dried, smoked, and pickled fish, appetizers and cocktails, soups and chowders, sauces, casseroles, luncheon and supper dishes, salads, sandwiches and snacks, and for canning and freezing fish. Attractively illustrated with many photographs, several of which are in full color.

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FISH JELLY:

"Studies on the Internal Spoilage of Fish-Jelly Products. III--Measurement of Oxidation-Reduction Potential in Fish-Jelly Products," by Motonobu Yokoseki, article, *Bulletin of the Japanese Society of Scientific Fisheries*, vol. 24, no. 9, 1959, pp. 765-769, illus., printed in Japanese with English abstract. Japanese

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The Use of Fish Oils for Fatliquoring Leather. III--Suitability of Ocean Perch, Herring, Salmon, and Menhaden Oils in Fatliquoring, by Victor Mattei and William T. Roddy, 14 pp., illus., printed. (Reprinted from The Journal of the American Leather Chemists Association, vol. LIV, No. 11, November 1959, pp. 640-653.) Tanners' Council Research Laboratory, University of Cincinnati, Cincinnati, Ohio. In this study, fatliquoring with ocean perch, herring, salmon, and menhaden oils produced leathers with about the same amount of extractable grease and the same firmness as did fatliquoring with cod oil. There was some evidence that the surface of leather fatliquored with the oil of cod was softer than that fatliquored with the oils from other fish.

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a number of statistical tables giving data on landings and value of catches by species during 1958.

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The Food and Agriculture Organization has published reports describing that Agency's activities under the Expanded Technical Assistance Program for developing the fisheries of many countries. These reports have not been published on a sale basis, but have been processed

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only for limited distribution to governments, libraries, and universities. Food and Agriculture Organizations of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

Report to the Government of Pakistan on a New Fish Harbour for Karachi, by A. van den Berg and H. van Pel, FAO Report No. 26, Part One - text, Part Two - plans, 60 pp. and 15 charts, processed, March 1952.

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Informe al Gobierno del Ecuador sobre el Proyecto y Construcción de la Estación Experimental para la Elaboración de Pescado de Manta y sobre los Metodos de Elaboración de Pescado (Report to the Government of Ecuador on the Planning and Construction of the Experimental Station for Processing Manta's Fish and on the Methods of Processing Fish), by K. Hoidal, FAO Report No. 720, 65 pp., illus., processed in Spanish, 1958.

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FRANCE:

"L'Exploitation des Eaux du Bassin de Thau" (Exploitation of the Waters of Lake Thau), by F. Doumenge, article, Revue de l'Economie Meridionale, vol. VII, no. 27, July-September 1959, pp. 243-266, illus., printed in French. Centre Regional de la Productivite et des Etudes Economiques, Faculte de Droit, Montpellier, France. Lake Thau, on the Mediterranean Coast of France, has a permanent link with the sea. Thus, its fisheries and effect on fisheries in the sea, are quite important.

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Jahresbericht über die Deutsche Fischwirtschaft, 1958 (Yearbook of the German Fisheries, 1958), 307 pp., illus., printed in German with summaries in English, DM 25 (about US\$5.98). Verlag Gebr. Mann, Berlin, Germany, October 1959. A review covering all phases of the German fisheries in 1958. Each chapter is followed by a summary in English and all statistical tabulations have English subcaptions. Issued by the Ministry of Food, Agriculture, and Forestry which includes the Fisheries Directorate. Part I contains information on fishery policy in 1958, the United Nations Conference on the Law of the Sea, landings, the fishing fleet, and consumption of fishery products. Part II includes information on cruises of the fishery protection vessels and fishery research vessel, the vocational seamen's association, the work of the German Scientific Commission for the Exploration of the Sea, and fishery research. Part III presents data on the German deep-sea fishery in 1958, the lugger herring fishery, cutter deep-sea and coastal fisheries, fresh-water fisheries, the fish processing industry, publicity campaign for sea fish in 1958/59, promotion of fish marketing, and elasticities in the demand for fishery products. Part IV, included in the yearbook for the first time, gives data on foreign fisheries and whaling.

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The Planktonic Stages of the Haddock in Scottish Waters, by Alan Saville, Scottish Home Department, Marine Research No. 3, 23 pp., illus., printed, 7s. 6d. (about US\$1.05). Her Majesty's Stationery Office, 13A Castle St., Edinburgh 2, Scotland, 1959.

INTERNATIONAL COMMISSIONS:

International Fisheries Convention of 1946, The Permanent Commission Report by the President on the Seventh Meeting (held in Dublin, November 1958), 35 pp., processed in French and English. Office of the Permanent Commission, Rm. 419, 3 Whitehall Place, London, S. W. 1, England, 1959. Proceedings of the Seventh Meeting of the Permanent Commission held at Dublin from November 25 through 28, 1958. Includes, among other topics, discussion of application of the present mesh provisions; reports from the liaison committee of the International Council for the Exploration of the Sea; proposal to increase the mesh size in trawl nets in the northeastern part of the Convention area; amendment of Article 7(2) of the Convention (use of cod-end covers); report by the Infractions Committee; request for contribution by the Permanent Commission to the funds of the International

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al Council for the Exploration of the Sea; and relations with other international organizations.

(International North Pacific Fisheries Commission) Annual Report for the Year 1958, 123 pp., illus., printed. International North Pacific Fisheries Commission, 6640 N. W. Marine Drive, Vancouver 8, B. C., Canada, 1959. This is the fifth consecutive annual report issued by the Commission since it was established by Convention between Canada, Japan, and the United States on June 12, 1953. It consists of three parts: a report of accomplishments of the Commission's annual meeting, held in Tokyo from November 4 through 10, 1958; a summary of administrative activities during the previous year; and progress reports on research conducted by the member governments under the Commission's program. For the first five years of operation of the Commission, abstention from fishing by certain contracting parties on the salmon, halibut, and herring stocks of the eastern North Pacific was operative without necessity of an annual determination as to continued qualification of the stocks originally specified. At the 1958 Annual Meeting, however, the Commission undertook a review of the qualification of stocks in question for continued abstention. No recommendation for a change in the stocks under abstention was made. Progress in research on the salmon questions raised by the Protocol has been outstanding. Knowledge of the distribution and intermingling of the several salmon species from the two continents is increasing steadily, although quantitative data on intermingling is meager. The great extent of the area of intermingling and the many complexities of intermingling by species and by time make the problem of confirming or changing the provisional line, in order to divide more equitably the salmon stocks from Asia and North America, a difficult one. Studies of the stock of king crab of the eastern Bering Sea were continued by Japanese and United States scientists. Research has not yet progressed sufficiently, however, to indicate whether or not joint conservation measures are required.

IRRADIATION PRESERVATION:

Proceedings of the International Conference on the Preservation of Foods by Ionizing Radiations, July 27-30, 1959, 294 pp., illus., processed. Department of Food Technology, Massachusetts Institute of Technology, Cambridge 39, Mass. Includes the Conference program, panel participants, foreign delegates, and list of observers, as well as the speeches and papers read during the Conference. While none of the papers deals directly with irradiation of fishery products, all are of vital interest to fishery technologists as well as industry members. Probably most pertinent are those papers on: "General Considerations Relating to Food Irradiation," by Bernard E. Proctor; "Direct and Indirect Effects of Radiations," by Samuel A. Goldblith; "A Program for the Evaluation of the Possible Toxicity of Irradiated Foods," by Irvin C. Plough; and "The Effects of Ionizing Radiations on the Nutritive Value of Foods," by Merrill S. Read.

ISRAEL:

Fishermen's Bulletin, vol. 3, no. 1 (21), September 1959, 28 pp., illus., printed in Hebrew with English abstracts. Fishermen's Bulletin, P. O. Box 699, Haifa, Israel. Includes, among others, these articles: "Trawl Boat Expenses in Foreign Currency," by M. Kramer and S. Lipstadt; "Savings Gear Experiments with Trawl Nets (1958-59)," by E. Gottlieb; and "Trawler and Trawl in Action, III," by M. Ben-Yami.

JAPAN:

Bulletin of the Japanese Society of Scientific Fisheries, vol. 25, no. 4, August 1959, 92 pp., illus., printed in Japanese with English summaries. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Minato-ku, Tokyo, Japan. Contains, among others, these articles: "Fishing Conditions for Squid off the Oki Islands. III--Effect of the Surface Current on Formation of Fishing Grounds," by Shumpei Kojima; "On the Spawning of the Ayu, *Plecoglossus altivelis* T. & S. I--Structure of the Spawning Shoal and Spawning Behaviour," by Rikizo Ishida; "Studies on the Discoloration in Fish Meat During Freezing Storage. II--A Spectrophotometric Method for the Simultaneous Determination of Ferrous and Ferric Forms of Myoglobin in Tuna Meat," by Yoshihiko Sano, Kanehisa Hashimoto, and Fumio Matsuura; "Effectiveness of Dip in Iced Chlorotetracycline (CTC)-Containing Sea Water on Keeping Quality of Mackerel A-board Ship and Determination of CTC Residue on the Fish," by Tetuo Tomiyama and Yasuo Yone; "Gas Content of the Blood in Response to that of Medium Water in Fish. II--Comparison of the Responses in Several Species," by Yasuo Itazawa; and "Change of Free Amino Acids During the Manufacturing Process of 'Katsuwobushi' (Dried Bonito)," by Shoji Konosu and Yoshiro Hashimoto.

Bulletin of the Japanese Society of Scientific Fisheries, vol. 25, no. 5, September 1959, 83 pp., illus., printed in Japanese with English summaries. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Minato-ku, Tokyo, Japan. Includes, among others, articles on: "Studies on the Estimate of the Distribution Density of Salmon Population on the High Seas," by Kisaburo Taguchi; "The Measurements of Tension on the Salmon Drift Net. I," by Yasuji Kondo and Makoto Suzuki; "Studies on the Method for Testing the Spoilage of Food. X--Errors Involved in Ota's Method for Determination of Histamine," by Atsushi Tsuda, Kenji Mori, and Tetuo Tomiyama; "On the Browning of or Dried Fish Products," by Chiaki Kozumi, Soichi Kurobe, and Junsaku Nonaka; "Studies on the Influence of Treatments Immediately After Catching upon the Quality of Fish Flesh. I--Examinations on Killing and Storing Methods for Keeping Quality of Mackerel, Dace, and Carp," by Yasuhiko Tsuchiya and others; "Studies on the Influence of Treatments Immediately After Catching upon the Quality of Fish Flesh. II--Further Examinations of Treatments on Keeping Quality of Fish," by Yasuhiko Tsuchiya and others; "Studies on the Influence of Treatments Immediately After Catch-

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ing upon the Quality of Fish Flesh. III--Effect of Several Treatments on Keeping Quality of Bass Meat," by Yasuhiko Tauchiya and others; and "Studies on the Proteinase of *Pyloric Caeca*. II--Preparation of Crystalline Proteinase of Tunny *Pyloric Caeca* by Ion Exchange Resin," by Yoshihisa Togasawa and Teizo Katsumata.

Bulletin of the Japanese Society of Scientific Fisheries, vol. 25, no. 6, October 1959, 98 pp., illus., printed in Japanese with English summaries. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kai-gandori 6-chome, Minato-ku, Tokyo, Japan. Includes, among others; these articles: "Studies on the Kinematic Behaviour of the Ground Rope of the Trawl Net. I," by Tasaé Kawakami and Otohiko Suzuki; "Annual and Monthly Variation of Fishing Condition and Distribution of Yellowfin Tuna in the Arabian Sea," by Jun Nakagome; "Annual and Monthly Variation of Fishing Condition and Distribution of Black Marlin in the Arabian Sea," by Jun Nakagome; "Studies on Movements of Albacore Fishing Grounds in the North West Pacific Ocean. II--Influence of Fluctuations of the Oceanographic Conditions upon the Migration and Distribution (Pattern) of Albacore in the Winter-Summer Period and Its Fishing Grounds in Southern Waters Off Japan," by Motoo Inoue; "Enhancing Effect of Starch on Jelly Strength of Fish Meat Jelly. III--Model Experiments with Synthetic Resin Particles," by Minoru Okada and Atsuko Yamazaki; "Enhancing Effect of Starch on Jelly Strength of Fish Meat Jelly. IV--Relation between Properties of Starch and Reinforcing Ability," by Minoru Okada and Atsuko Yamazaki; "Enhancing Effect of Starch on Jelly Strength of Fish Meat Jelly. V--Application of Modified Starch to Kamaboko Manufacture," by Minoru Okada and Atsuko Yamazaki; "Studies on the Method for Testing the Spoilage of Food. XI--A New Method for Determination of Histamine in Tissues," by Atsushi Tsuda and Tetpu Tomiyama; "Comparative Studies on Two Hemoglobins of Salmon. II--Crystallization and Some Physical Properties," by Kanehisa Hashimoto and Fumio Matsura; "Studies on the Proteinase of *Pyloric Caeca*. III--Preparation of Crystalline Proteinase of Bontito *Pyloric Caeca*," by Yoshihisa Togasawa, Teizo Katsumata and Masashi Ishikawa; "Studies on the Food Poisoning Associated with Putrefaction of Marine Products. VIII--Distribution of 1-(γ)-Histidine Decarboxylase among *Proteus* Organisms and the Specificity of Decarboxylating Activity with Washed Cell Suspension of *Proteus morgani* with Special Reference to the pH," by Toshiharu Kawabata and Shigeru Suzuki; and "Studies on the Food Poisoning Associated with Putrefaction of Marine Products. IX--Factors Affecting the Formation of 1-(γ)-Histidine Decarboxylase by *Proteus morgani*," by Toshiharu Kawabata and Shigeru Suzuki.

LAKE TANGANYIKA:

Note sur la Pêche au Ndagala au Lac Tanganika (Note on the Ndagala Fishery of Lake Tanganyika), by A. Collart, 16 pp., illus., printed in French. (Reprinted from Bulletin Agricole du

Congo Belge, vol. 47, no. 4, 1956.) Direction de l'Agriculture des Forêts et de l'Élevage, 7, Place Royale, Brussels, Belgium, 1956.

Pêche Artisanale et Pêche Industrielle au Lac Tanganika (Traditional Fishery and Industrial Fishery of Lake Tanganyika), by A. Collart, 100 pp., illus., printed in French. Direction de l'Agriculture des Forêts et de l'Élevage, 7, Place Royale, Brussels, Belgium, 1958.

LEGISLATION:

State Boat Act, 11 pp., printed. (Reprinted from Suggested State Legislation--Program for 1959, pp. 53-63.) The Council of State Governments, 1313 East 60th St., Chicago 37, Ill. Describes a model code developed by the Committee on Suggested State Legislation of the Council of State Governments. This code is designed to complement Public Law 85-911, which provides that after April 1, 1960, all motorboats not having marine documents from the U. S. Bureau of Customs must be numbered for purposes of identification.

MACKEREL:

"O Priniatii Mer po Prekrashcheniiu Vylova Molodi Stavridy, *Trachurus*" (On Measures of Ending the Catching of Young Mackerel), by Iu. P. Zaitsev, article, *Rybnoe Khoziaistvo*, no. 4, April 1958, pp. 12-13, printed in Russian. *Rybnoe Khoziaistvo*, Four Continent Book Corporation, 822 Broadway, New York 3, N. Y.

"Sezonnye Izmeneniia V Promysle Stavridy, *Trachurus*, V Chernom More" (Seasonal Changes in the Mackerel Fishery in the Black Sea), by T. G. Liubimova, article, *Rybnoe Khoziaistvo*, no. 5, May 1958, pp. 13-15, printed in Russian. *Rybnoe Khoziaistvo*, Four Continent Book Corporation, 822 Broadway, New York 3, N. Y. The large mackerel fishery in the Black Sea was organized in 1953. During the past five years there have been explorations, surveys, and checks on the distribution, feeding, and nursery grounds, migration, and catching techniques. Analysis showed that between 1954-1957 hauls have diminished to half. The entire life cycle of large mackerel proceeds within the boundary of the Black Sea. In spring, mackerel migrate to northern Caucasus and to the Crimea sections for spawning. During their advance toward the northwestern part of the Sea, mackerel feed intensively, often stopping for a long time to devour large groups of anchovy. While spawning, in June-July, mackerel keep in small groups, and landings are light. After spawning, mackerel go to the shore area in the southeastern part of the Sea. Here mackerel are caught in drop nets. For the winter, the fish migrate to Anatoli Beach. Records show that Black Sea mackerel have been found to be from 2-13 years of age and in sizes of 25-44 cm. Between 1949-1957, small mackerel completely disappeared. Older and larger fish, from six years and over, predominate, and in the past few years their sizes have been from 30-48 cm. This accounts for the shift and maximum catches during the spring and summer months. Since older groups of mackerel remain on the

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feeding grounds for a shorter period and migrate earlier for the winter, the fall fishery in the Caucasus has diminished. Efforts are being directed now to concentrate the catching and utilization of mackerel during their spring migration.

MARKETING:

Sales Contests for Wholesalers, by Henry D. Ostberg, Small Marketers Aids No. 47, August 1959, 4 pp., illus., printed. Small Business Administration, Washington 25, D. C. Practical suggestions for sales contests are presented. A well-planned contest can boost the salesmen's morale as well as increase the firm's sales. The five steps, outlined in this leaflet, that are involved in setting up a successful contest are: (1) establishing the purpose, (2) deciding on a scoring method, (3) selecting a theme and prizes, (4) promoting, and (5) awarding the prizes.

NUTRITION:

"Nutritional Values and Vitamins of Norwegian Fish and Fish Products," by Torleiv Taarland and others, article, Tidsskrift for Hermetikkindustri, vol. 44, 1958, pp. 405-412. Tidsskrift for Hermetikkindustri, Stavanger, Norway.

OCEANOGRAPHY:

Annual Report of the Oceanographic Institute, Fiscal Year 1958-1959, 20 pp., processed. The Oceanographic Institute, Florida State University, Tallahassee, Fla., November 1959. Describes the functions and activities of the Oceanographic Institute during the fiscal year July 1, 1958 to June 30, 1959. Emphasis is placed on research projects completed or currently underway.

PARASITES:

Parasites of the Commercial Shrimps, PENAEUS AZTECUS Ives, P. DUORARUM Burkenroad, and P. SETIFERUS (Linnaeus), by Dwayne Nathaniel Kruse, 22 pp., illus., printed. (Reprinted from Tulane Studies in Zoology, vol. 7, no. 4, October 19, 1959, pp. 123-144.) Florida State University, Oceanographic Institute, Tallahassee, Fla.

PERU:

La Pesca en el Peru en 1958 (Peru's Fishery in 1958), by Javier Iparraguirre Cortez, Serie de Divulgacion Cientifica No. 12, 14 pp., processed in Spanish. Dirreccion de Pesqueria y Caza, Ministerio de Agricultura, Lima, Peru. A statistical report on Peru's fishery in 1958, including data on fish freezing, fish canning, fish meal and oil, production of fish and shellfish by species and ports, volume and value of fishery products consumed in the city of Lima, national consumption of domestic and imported fish, supplies of fish in the city of Lima, utilization of fish landed, imports of fishery products, exports by type of product and country of destination, and landings of whales.

PORPOISES:

Auditory Perception of Submerged Objects by Porpoises, by W. N. Kellogg, 6 pp., illus., printed. (Reprinted from The Journal of the Acoustical Society of America, vol. 31, no. 1,

January 1959, pp. 1-6.) Florida State University, Oceanographic Institute, Tallahassee, Fla.

Echo Ranging in the Porpoise, by W. N. Kellogg, 7 pp., illus., printed. (Reprinted from Science, vol. 128, no. 3330, October 24, 1958, pp. 982-988.) Florida State University, Oceanographic Institute, Tallahassee, Fla. Perception of objects by reflected sound is demonstrated for the first time in marine animals.

QUALITY:

"Improvement in Quality of Iced White Fish—Boxing at Sea and Stowage in Chilled Sea Water," article, Food Investigation 1957, Report of the Food Investigation Board (Great Britain), pp. 6-7, printed. Department of Scientific and Industrial Research, Charles House, 5-11 Regent St., London S. W. 1, England, 1958.

SANITATION:

"The Care of the Trawler's Fish," by C. L. Cutting, G. C. Reay, and J. M. Shewan, D. S. I. R. Food Investigation Leaflet No. 3, 14 pp., printed, 9d. (about 10 U. S. cents). Her Majesty's Stationery Office, York House, Kingsway, London W. C. 2, England, 1953.

SEA LIONS:

"Sea Lion Hunt," by Vincent Sollecito, Alaska Sportsman, vol. 26, no. 1, January 1960, pp. 8-11, 42-46, illus., printed. Alaska Sportsman, Alaska-Northwest Publishing Co., Juneau, Alaska. Recounts the trip of the vessel "Arctic Maid" to the islands of southwestern Alaska, in the Kodiak area, to hunt for predatory sea lions. The voyage was financed by the U. S. Fish and Wildlife Service, which supplied three biologists to study these mammals which are considered a menace to the salmon and halibut fisheries. The objectives of the hunt were to determine whether the sea lion population could be cut down, and to find out if the kill would be commercially profitable.

SEA ROBIN:

"The Sea Robin," by Alfred Perlmutter, article, The New York State Conservationist, vol. 14, no. 3, December-January 1959-60, pp. 12-13, illus., printed. New York State Conservation Dept., Arcade Bldg., Albany, N. Y. Describes the sea robin—a neglected food and sport fish. Although the sea robin is covered with bony plates and has sharp spines on the fins, the meat is tender and succulent and has long been prized by some Europeans. A series of photos shows the sea robin "from fantasy to frying pan in six easy steps."

SEA TROUT:

A Contribution to the Biology of the Spotted Weakfish, CYNOSCIUS NEBULOSUS, (Cuvier), from Northwest Florida, with a Description of the Fishery, by Edward F. Kilma and Durbin C. Tabb, Technical Series No. 30, 23 pp., illus., printed. The Marine Laboratory, University of Miami, Virginia Key, Miami 49, Fla. Describes the material and methods used in a study of the spotted sea trout (weakfish), the commercial fishery and landings, the sport fishery, gear selectiv-

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ity, age and growth, spawning, size and age at first maturity, food, and ecology.

SNOOK:

Aspects of the Biology of the Common Snook, CENTROPOMUS UNDECIMALIS (Bloch) of South-west Florida, by Alfred V. Volpe, Technical Series No. 31, 35 pp., illus., printed. The Marine Laboratory, University of Miami, Virginia Key, Miami 49, Fla., June 1959.

SPAIN:

"Ante la I Asamblea de Cofradías de Pescadores" (Preparations for the First General Assembly of Fishermen's Trade Unions), article, Boletín de Informacion del Sindicato Nacional de la Pesca, no. 13, October 1959, pp. 6-29, illus., printed in Spanish: Sindicato Nacional de la Pesca, Paseo del Prado, 18-20, 6a Planta, Madrid, Spain. Presents a summary of preparations for the First Assembly of Spain's Fishermen's Trade Unions, held in Madrid November 24-28, 1959. Explains the establishment of various committees and thereby describes much of the structure of the Spanish fishing industry.

SPANISH MACKEREL:

Aspects of the Biology and the Fishery for Spanish Mackerel, SCOMBEROMORUS MACULATUS (Mitchell), of Southern Florida, by Edward F. Klika, Technical Series No. 27, 37 pp., illus., printed. The Marine Laboratory, University of Miami, Virginia Key, Miami 49, Fla., June 1959. Describes the methods and material used in a study of the Spanish mackerel fishery of Florida, its taxonomy, commercial and sport phases, and gear selectivity. A section on biology discusses an analysis of stomach contents, spawning, size at maturity, and age and growth of the Spanish mackerel.

SPOILAGE:

A Note to the Fishing Skippers Regarding the Factors that Hasten Deterioration of Fish in the Boats at Sea, Circular New Series No. 1, 6 pp., printed. Fisheries Research Board of Canada, Fisheries Experimental Station, Halifax, Nova Scotia, Canada, June 1953.

Spoilage Problems in Fresh Fish Production, by C. H. Castell, Bulletin No. 100, 25 pp., printed. Fisheries Research Board of Canada, Ottawa, Canada.

SURINAM:

L. V. V. in 1957 (1957 Annual Report of Department of Agriculture, Animal Husbandry, and

Fisheries), 216 pp., illus., printed in Dutch. Department of Agriculture, Animal Husbandry, and Fisheries, Paramaribo, Surinam. The section of this report covering fisheries includes information on management and organization; production, import, and export of fish and fish products; research; development of the fishery and related information.

TRANSPORTATION:

"The Road Transport of Sea Products," by M. Duclos, article, Revue Generale du Froid, vol. 35, no. 9, September 1958, pp. 863-865, printed in French. Association Francaise du Froid, 129 Boulevard St. Germain, Paris, France.

"Transport of Fresh Fish by Rail: Individual Shipment, Grouping and Ungrouping," by J. B. Verlot, article, Revue Generale du Froid, vol. 35, no. 9, September 1958, pp. 865-868, illus., printed in French. Association Francaise du Froid, 129 Boulevard St. Germain, Paris France.

TROUT:

Tackle Talk and Trout, 18 pp., illus., printed, single copy 50 cents. U. S. Trout Farmers' Association, Box 55, Buhl, Idaho. Describes briefly the four main species of U. S. trout—the rainbow, brook, brown, and native cutthroat. Tells how to catch, care for, and cook trout and presents many helpful illustrations.

U. S. Mountain Trout, 7 pp., illus., printed, single copy 25 cents. U. S. Trout Farmers' Association, Box 55, Buhl, Idaho. A well illustrated handbook describing the handling, cooking, and serving the ever-popular mountain trout.

TUNA:

"Le Comité Interprofessionnel du Thon Fixe le Cadre de la Campagne de Pêche à l'Albacore" (The Inter-Professional Committee on Tuna Plans for the Albacore Fishing Season), by L. Plouas, article, La Pêche Maritime, vol. 38, no. 980, November 1959, pp. 675-676, printed in French. La Pêche Maritime, 190, Boulevard Haussmann, Paris, France.

VITAMIN A:

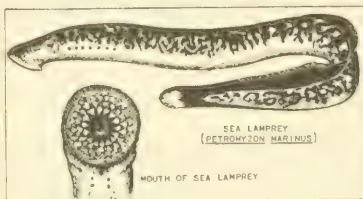
"Isomers of Vitamin A in Fish Liver Oils," by Patricia S. Brown, William P. Blum, and Max H. Stern, article, Nature, vol. 184, no. 4696, October 31, 1959, pp. 1377-1379, illus., printed. Nature, MacMillan & Co., Ltd., St. Martin's St., London W. C. 2, England.



CALIFORNIA LAMPREYS

Three kinds of lampreys are found in California. These are the Pacific lamprey, the brook lamprey, and the river lamprey.

Lampreys are sometimes confused with eels, and are often called "lamprey eels." The true eels are bony fishes. Lampreys may be distinguished from eels and all other true fishes by the possession of a circular sucking mouth without functional jaws, the lack of paired fins, and the presence of seven external gill openings on each side close behind the head instead of the single gill opening of true fishes.



The eggs hatch into a larval form which is blind, toothless and worm-like. A fleshy hood overhangs the mouth.

The Pacific lamprey is the lamprey most commonly seen in its adult form. The adults attain a length of around two feet and average two to three inches in diameter at greatest girth. They are brown, gray, or blackish in color and quite slippery and slimy to the touch. They are common in coastal streams from Southern California to Unalaska, and are most easily observed during spring upstream migrations.

Adults normally migrate upstream from the ocean during the spring and spawn in gravel, excavating a circular depression by removing stones from the nest sites by means of their sucking discs. The adults die after spawning.

The eggs hatch in a few weeks, and the young lampreys burrow into the stream bottoms where they spend their entire larval existence. The young are believed to feed on materials they strain from the oozy materials on the bottom. Although the exact duration of this stage is not known, it is believed to last three to four years.

The larvae grow gradually, reaching a size of up to 10 inches. As they mature, the fleshy hood surrounding the mouth disappears, and the disc-like sucking mouthparts edged with small, sharp teeth develop. The eyes become functional. This form is parasitic and may attach itself to fishes, rasping a hole through the body covering and feeding upon the body fluids.

Such attacks are often lethal to fish under 12 inches in length, which are unable to rub off or otherwise disengage the lampreys. Adult king salmon in the Klamath River often bear lamprey scars or even attached lampreys. However, the fish apparently survive and are little damaged.

The young lampreys usually migrate to the ocean during the winter or spring. In the ocean, the lampreys maintain their parasitic mode of life, attacking various species of fishes. They have even been known to attach themselves to whales, as evidenced by the resulting scars.

The Pacific lamprey appears to be little utilized for food today, probably more due to prejudice than taste. Professor J. O. Snyder, famed ichthyologist, told of eating lampreys cooked over a green willow grate by Indians in Humboldt County, and said that the meat of these lampreys was rich in oil and very good eating. They are also eaten smoked. Here is a new experience awaiting the curious epicure.

One author states, "In atonement for its unsightly appearance and destructive behavior, the lamprey has partly redeemed itself by delighting the appetites of epicures for centuries. History tells us that the wise King Henry I of England did so love the lowly lamprey that he met his inglorious death by eating too many at one sitting."

Lampreys are looked upon with disfavor because of their habit of parasitizing desirable game fishes. Although the amount of mortality the Pacific lamprey causes in fish populations is not known, the occurrence of parasitic lampreys in California is in no manner comparable to the explosive invasion of the Great Lakes by the Atlantic sea lamprey.

The barrier of Niagara Falls originally excluded the Atlantic sea lamprey from most of the Great Lakes (with exception of Lake Ontario). However, when man provided access for shipping through the Welland Canal, he also left an open door for the lamprey.

The situation on the Pacific Coast is entirely different. The parasitic lampreys have inhabited the waters of the area for thousands of years. There is no problem of invasion of virgin areas, and the fish populations are adjusted to their presence.

The Pacific lamprey spends its entire parasitic existence in salt water and, as a rule, does not feed in fresh water. However, in at least three instances, the construction of dams across coastal streams has resulted in the interruption of normal downstream migration of lampreys to the sea.

In such cases, they have heavily parasitized fish present. After several seasons, the lampreys have died off, although a landlocked population is established in Copco Lake, Siskiyou County.

In general, the only means of control presently known is the blocking of adult runs from migration upstream to spawning areas. This is usually accomplished by providing an overhanging lip on a dam, over which the lampreys cannot climb because of loss of suction. Establishment of electrical barriers has likewise been tried in other parts of the country. The development of selective poisons for lamprey control is now in the experimental stage and shows considerable promise.

The brook lamprey is much smaller, averaging about five inches in length. It occurs from Europe through Siberia to Alaska, and thence southward to Central California. In most areas of California, it is less abundant than the Pacific lamprey.

The adults are comparable in size to the larvae of the Pacific lamprey, and the two are not readily distinguished by casual inspection. In general, its life history pattern is believed to be similar to that of the Pacific lamprey, except that it is not parasitic. Upon changing to an adult, it ceases feeding and growing. The teeth become small and dull or fragmented, and the digestive system becomes nonfunctional. This change takes place during late summer or fall, and the winter is passed in this stage.

The following spring, after spawning, death occurs. From the limited knowledge of its life history and habits, it appears to be of little or no economic importance.

The river lamprey is a small parasitic form occurring in the Sacramento-San Joaquin Delta region, San Francisco Bay, and in the Sacramento River upstream at least to Mill Creek, Tehama County. It is the least abundant of the three species found in California. It also occurs in Oregon, Washington and British Columbia. Mature specimens attain an average length of about seven inches. Little is known of its habits or behavior. (Outdoor California, July 1959.)

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"BETTER MEALS" PROMOTION SLATED FOR REPEAT IN 1960

The "Better Meals Build Better Families" promotion introduced for the first time by the Bureau of Advertising of the American Newspaper Publicities Association September 14-26, 1959, is slated for a repeat in 1960. The decision to repeat this promotion was predicated largely on the tremendous support given to last year's campaign.



Here are a few statistics on the 1959 campaign recently released by the sponsors: 973 newspapers with 86 percent of the readership in the United States and Canada tied-in; 350 to 400 newspapers kicked off the event with special sections; 225 news-

papers ran special cookbooks; 100 newspapers ran recipe sections; almost all of the cooperating newspapers ran some "Better Meal" recipes; 250 newspapers ran special consumer contests; 175 mayors and many governors proclaimed special "Better Meals" weeks; retailers gave widespread heavy support to the promotion, notably in their use of the "Better Meals" emblem in their advertising; all leading chains, co-ops, and voluntaries tied-in; all major food trade associations endorsed it; and follow-up surveys in 15 representative market areas showed that 62 percent of the consumers recognized and remembered the "Better Meals Build Better Families" slogan.

The U. S. Bureau of Commercial Fisheries tied-in with last year's "Better Meals" promotion through issuance of a special fisheries marketing bulletin as part of its continuing consumer education program in cooperation with the commercial fishing industry. This food-editor bulletin contained six kitchen-tested fish recipes and nutritionally-balanced menus developed by the Bureau's home economists. This bulletin also contained a variety of nutritional facts regarding fishery products. The Bureau expects to issue a tie-in bulletin again this year to assist homemakers in menu planning to "build better families through better meals." The fishery trade can cash-in on the 1960 campaign by building its advertising during this promotional period around the "Better Meals Build Better Families" theme.

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Fishes

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COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries
prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
H. M. Bearse, Assistant Editor

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May 21, 1957. 5/31/60

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COVER: In the foreground is the tuna cannery of a large Terminal Island, Calif., fish-packing firm. Considered the world's largest fish cannery, it has a daily capacity of 15,000 standard cases of 48 halves on an eight-hour shift. The two unloading docks in the foreground on the right can accommodate 4 large tuna vessels at one time. Thawing tables can be seen at the cannery end of the unloading docks. The cannery employs 800 and has 8 packing lines. Daily unloading capacity is about 700,000 pounds or 350 tons of raw tuna.

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PROCESSING AND QUALITY STUDIES OF SHRIMP HELD IN REFRIGERATED SEA WATER AND ICE

Part 2 - Comparison of Objective Methods for Quality Evaluation of Raw Shrimp

By Jeff Collins,* Harry Seagran,* and John Iverson**

ABSTRACT

A report on the suitability of certain objective tests as quality indices for raw shrimp held in refrigerated sea water and in ice.

BACKGROUND

The technical literature indicates that a refrigerated sea-water system has several potential advantages over an icing system. In the first study reported in the present series on the possible use of refrigerated sea-water with Alaska shrimp (Collins 1959), it was found that pink shrimp machine peeled satisfactorily after being held in refrigerated sea-water and yielded a product of satisfactory quality. Before the relative usefulness of refrigerated sea-water could be evaluated, however, data were needed on how the quality of the shrimp is affected by holding and processing variables.

For this work, objective methods of assessing quality were necessary. Many objective tests--such as total volatile base, total volatile acid, trimethylamine, and so on--have been proposed, each one of which gives certain information. The purpose of the present work was to find which of these various tests is the most suitable for the objective evaluation of the quality changes of shrimp held in refrigerated sea-water as well as in ice.



Fig. 1 - An Alaska shrimp boat showing the beam trawl on deck.

The purpose of the present work was to find which of these various tests is the most suitable for the objective evaluation of the quality changes of shrimp held in refrigerated sea-water as well as in ice.

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EXPERIMENTAL

The general experimental approach was (1) to hold shrimp for a period of time in refrigerated sea-water and in ice, (2) to make measurements at intervals of time by various objective tests and by a subjective test as well, and (3) to determine which of the objective tests yielded the most information in the light of the findings of the subjective test. Details of the experiment follow.

MATERIAL: About 120 pounds of whole fresh pink shrimp (*Pandalus* species) were obtained from Wrangell, Alaska. The shrimp were landed within a few hours of capture, iced overnight, and shipped via air to the laboratory on the following morning. The shrimp were then briefly rinsed in cold fresh water and allowed to drain for a few minutes.

HOLDING METHODS: Iced: The drained shrimp were mixed with crushed ice (about 2 to 1, ice to shrimp ratio), placed in an insulated ice chest in perforated containers, and held up to 10 days. The shrimp were re-iced daily.



Fig. 2 - Gathering the beam-trawl net prior to brailing the catch.

kettle containing the shrimp and brine was suspended in the refrigerated sea-water tank. Circulation of the brine in the kettle was obtained by use of an external centrifugal pump. In this "open" system, the only deviation from the normal refrigerated sea-water system was that of temperature. The temperature varied between 31° and 35° F. (rather than the normal 29°-31° F.).

The purpose in maintaining comparative samples in "closed" and "open" systems was to determine what effects (if any) the limitation of oxygen would have on the results of the tests employed. It is recognized that at least initially the closed system is not anaerobic. During storage, it is likely that such a system becomes less aerobic, and as a result, the over-all spoilage products may include products of anaerobic processes. If the results of the tests employed do not reflect a difference between systems, the closed system would be employed in subsequent series on refrigerated sea-water-holding variables, since more exact control of experimental conditions are possible.

PREPARATION OF SAMPLES FOR ANALYSIS: At selected intervals during this time series, as well as for a control, about 1.5 kilograms (3.3 pounds) of the whole shrimp, for each of the methods of holding, was quickly peeled by hand. The unwashed meats were homogenized in an electric blender, vacuum-seamed in ½-pound, flat, C-enamel cans, and held in a plate freezer at -20° F.

Refrigerated Sea Water--"Closed": The whole drained shrimp were held by the normal refrigerated sea-water method (Collins 1959) except that the shrimp were held in this time series up to 8 days in a closed system. That is, 1.5 kg. (2.2 pounds) of shrimp and 1.5 kg. (2.2 pounds) of brine were placed in No. 10 (C-enamel) cans, sealed, and then submerged and held in the refrigerated sea-water tank. The cans were essentially filled.

Refrigerated Sea Water--"Open": A stainless-steel

ANALYTICAL METHODS: The following analyses were carried out on these samples: total nitrogen, oil, total solids, ash, total chloride (Association of Official Agricultural Chemists 1955), total volatile base (Stansby, Harrison, Dassow, and Sater 1944), total volatile acid (Friedemann and Brook 1938), trimethylamine (Dyer 1945), amino nitrogen (Pope and Stevens 1939), and glycogen (Van Der Kleij 1951). Nonprotein nitrogen was obtained by extracting the homogenized meat three times with 5-percent trichloroacetic acid and determining the total nitrogen content (AOAC 1955) of the centrifuged and filtered extract. A glass electrode was used to determine the pH of a 2-to-1 mixture of distilled water and homogenized meat. In addition to these objective tests, the whole, raw, cold shrimp at each time interval were subjectively judged for odor prior to being peeled.

RESULTS AND DISCUSSIONS

The analytical data obtained using these objective tests on the shrimp held in ice or in refrigerated sea-water are given in table 1.

Table 1 - Analytical Data on Pink Shrimp Held in Ice and Refrigerated Sea-Water (RSW) Using Various Objective Quality Assessment Methods

Method	Holding Time Days	Nitrogen			Total Volatile Base	Total Volatile Acid	Trimethylamine	Oil	Total Solids	Ash	Total Chloride	Corrected Ash	Glycogen	pH	
		Total	Nonprotein	Amino	Meq. N/100g	Hy/100g	Mg. TMA-N/100g				(Percent)	As %NaCl			(ash-NaCl) (Percent)
Control Ice	0	3.008	0.800	0.333	5.56	0.107	0.24	1.08	20.50	1.46	0.48	0.98	0.026	8.15	
	1	2.781	0.703	0.279	6.01	0.115	0.40	1.06	18.32	1.27	0.51	0.76	0.027	7.68	
	2	2.578	0.580	0.222	6.01	0.115	0.20	1.14	16.96	1.02	0.30	0.72	0.032	7.63	
	3	2.300	0.442	0.161	6.14	0.163	0.52	1.06	15.35	0.82	0.18	0.64	0.028	8.10	
	4	2.318	0.446	0.175	7.12	0.186	0.92	1.08	15.27	0.89	0.20	0.69	0.031	8.40	
	5	2.239	0.387	0.140	7.57	0.218	0.52	1.08	14.82	0.87	0.15	0.72	0.028	8.24	
	6	1.992	0.303	0.108	6.66	0.236	1.72	1.12	13.76	0.79	0.10	0.69	0.023	8.25	
	8	2.014	0.251	0.082	7.89	0.226	1.72	1.07	13.55	0.62	0.09	0.53	0.021	8.35	
	10	1.921	0.240	0.060	9.58	0.252	2.92	1.04	12.85	0.55	0.04	0.51	0.020	8.29	
	RSW (open)														
RSW (closed)	1	2.568	0.514	0.190	4.60	0.069	0.28	0.94	16.67	2.00	1.42	0.58	0.026	7.98	
	2	2.279	0.478	0.143	5.05	0.178	0.52	0.94	16.24	2.23	1.58	0.65	0.029	8.20	
	3	2.098	0.422	0.140	6.31	0.200	0.98	0.94	15.49	2.08	1.83	0.45	-	8.20	
	4	2.058	0.390	0.133	9.35	0.360	1.44	0.92	14.83	2.34	1.65	0.69	0.028	8.44	
	5	1.982	0.409	0.140	25.64	0.740	26.88	0.92	14.80	2.38	1.65	0.73	0.024	8.35	
	6	2.042	0.437	0.165	42.63	1.13	46.40	0.94	15.06	2.31	1.62	0.69	0.023	8.20	
	8	2.023	0.478	0.150	59.67	1.86	61.66	0.94	14.85	2.31	1.65	0.66	0.022	8.43	
	10	2.562	0.584	0.227	4.63	0.061	0.40	1.06	18.18	1.91	1.17	0.74	0.024	7.70	
RSW (closed)	1	2.460	0.532	0.187	5.15	0.117	0.26	0.86	17.06	2.02	1.40	0.53	0.033	7.95	
	2	2.295	0.428	0.165	4.88	0.177	0.92	0.98	16.59	2.28	1.51	0.77	0.031	8.06	
	3	2.214	0.450	0.157	6.95	0.215	1.72	1.12	16.53	2.31	1.51	0.80	0.032	8.33	
	4	2.160	0.455	0.160	13.52	0.356	9.60	1.04	16.19	2.32	1.60	0.72	0.029	8.25	
	5	2.173	0.457	0.149	27.42	0.606	28.80	0.92	15.71	2.31	1.59	0.72	0.029	8.32	
	6	2.100	0.478	0.166	47.86	1.40	55.20	1.02	15.68	2.37	1.60	0.77	0.027	8.35	

The samples that had been held in ice were noted as being completely fresh for 5 days, as being somewhat stale on the 6th day, as possessing a very slight off-odor on the 8th and 10th day, and as being definitely spoiled by the 13th day. The limit of acceptability could probably be set at about the 7th day. The long acceptability period of the shrimp held in ice in this experiment was undoubtedly due to the very thorough icing condition employed.

By the subjective test, the samples held in refrigerated sea water were considered to be fresh at the time of examination on the 4th day of storage. Sometime thereafter, between the 4th and 5th day, the compressor of the refrigerated sea-water unit malfunctioned, causing a significant rise in temperature for a period of several hours. As a result, on the 5th day, shrimp in both of the refrigerated sea-water systems had a definite spoilage odor.

A direct comparison of the ice-held and refrigerated sea-water-held shrimp was not possible because of the malfunction. However, certain of the objective quality tests picked up this malfunction, whereas others did not. Of the various objective spoilage tests, only volatile base, volatile acid, and trimethylamine values correlated well with the subjective ratings or picked up the malfunction. Trimethylamine seemed particularly good as a spoilage test for all samples. The pH values indicated a slight upward trend over the storage period but were of insufficient magnitude to be of any value as a spoilage test. Glycogen values showed a slight

upward trend to a maximum after about 2 days and then a very gradual drift back down to about the initial value.

In fresh pink shrimp, about 25 percent of the total nitrogen is nonprotein nitrogen and about 40 percent of this nonprotein nitrogen is alpha amino nitrogen (free amino acids). All three nitrogen fractions (total, nonprotein, and amino) decreased in the shrimp during the holding period in ice. The continuous washing action of melting ice is thought to cause a true leaching of the initial nonprotein nitrogen and a further leaching of this material as it is formed through enzymatic hydrolysis of protein. For the shrimp held in refrigerated sea-water, the total nitrogen also decreased, but at a slower rate than did that of the shrimp held in ice. The nonprotein and amino nitrogen fractions decreased to a minimum at the 4th day and then slowly increased for the remainder of the holding time. It appears that in the refrigerated sea-water system, a condition exists such that after the initial leaching period (to the 4th day here), the total nonprotein nitrogen accumulates through enzymatic hydrolysis of protein at a faster rate than it is utilized by bacteria.

Total solids and corrected ash^{1/} tended to decrease over the holding period, whereas oil showed little change. The salt uptake of the shrimp in the refrigerated sea-water system was rapid, equilibrium being reached within 3 days.



Fig. 3 - Brailing the catch from the beam trawl.

With respect to the refrigerated sea-water systems employed in this study, it was observed that the odors for the shrimp held in the "open" system were slightly different from the odors of those held in the "closed" system, and the shrimp held in the open system spoiled at a faster rate than did those held in the closed system. Although it is recognized that there are certain differences in aerobic and anaerobic spoilage which may account for the slight differences in odor noted, it was concluded that the different rates of spoilage, as determined by the objective tests, were caused by the differences in temperatures between the two systems. The objective tests appeared to apply equally well to the detection of spoilage in either system and to the detection of that in ice.

SUMMARY AND CONCLUSIONS

The purpose of this study was to determine which of 13 objective tests would adequately serve as spoilage indices and provide for general characterization of shrimp held in refrigerated sea-water and in ice. In addition, information was required on any differences which might arise between the quality of shrimp held in a "closed" or "open" refrigerated sea-water system.

From the data obtained, the following objective tests were concluded to be suitable: (1) trimethylamine and volatile acids, as indices of bacterial spoilage; (2)

^{1/}Corrected ash: total ash minus NaCl.

amino nitrogen, non-protein nitrogen, and total nitrogen, as indices of enzymatic action; and (3) total solids and total chloride, for general characterization. The "closed" system will be used in subsequent studies, since no differences were found by the methods employed in this study between shrimp held in the two refrigerated sea-water systems (except those caused by temperature differences).

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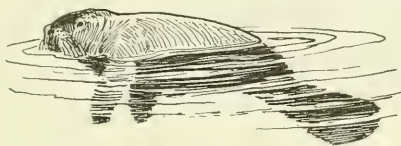
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MANATEE FOR AQUATIC VEGETATION CONTROL?

The Food and Agricultural Organization of the United Nations and the Indo-Pacific Fisheries Council are exploring



the possibility of introducing manatees (sea cows) into Ceylon and Thailand to control aquatic vegetation. In the United States manatees are most

abundant in Florida waters, though their range is said to cover much of the Gulf of Mexico coast; they occur also on the northern coast of South America. Unfortunately, little is known of their age at maturity, maximum size, longevity, and tolerances for temperature variations and transportation over long distances. If successful, this would be true biological control of aquatic weeds, a problem in many parts of the world.

SHRIMP-WASTE MEAL: EFFECT OF STORAGE VARIABLES ON PIGMENT CONTENT

J. E. Rousseau, Jr.*

ABSTRACT

One of the potential uses of shrimp-waste meal is as a supplement in the ration of hatchery-raised trout. The astaxanthin present in the meal gives trout a desirable color. This paper reports (1) a study of a method of analysis of the pigment and (2) the effect of storage variables on pigment losses and the development of oxidative rancidity. The benefits to be derived from addition of antioxidants were investigated.

INTRODUCTION

Astaxanthin, a carotenoid pigment present in certain insects and crustacea, has been identified as being one of the principal dietary pigments causing coloration in trout (Goodwin 1954). Hatchery-raised trout usually lack this natural and desirable coloration unless a source of the pigment--for example, salmon eggs or shrimp--is included in the diet. The use of such supplements in production-type rations, how-

ever, has not been a common practice because of limited supply or prohibitive cost. Recent feeding tests now have shown that meal prepared from Alaska shrimp waste also would impart a natural coloration to young rainbow trout (Sinnhuber 1955¹/). This finding indicated a potential outlet in trout-hatchery feeds for the considerable amount of waste being discarded annually by the Alaska shrimp industry.



Fig. 1 - Spectrophotometric determination of astaxanthin in Alaska shrimp-waste meal.

coloring trout. There is consequently a need for information as to the effect of storage variables on the destruction of the pigment. A problem exists also in the analytical determination of the astaxanthin.

Astaxanthin, in common with other carotenoids, is destroyed readily by heat, air, and light. The pigment thus may become a limiting factor in the value of meal when used for the purpose of

The purposes of the work reported here therefore were as follows:

1. To study the method of analysis of the pigment.
2. To determine the effect of storage on loss of the pigment and the development of oxidative rancidity in Alaska shrimp-waste meal, which has a relatively high oil content (Brown 1959), and to compare concurrently the effectiveness of antioxidants in retarding these changes.

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¹/R. O. Sinnhuber, Food Technology Department, Oregon State College, Corvallis, Oregon. Unpublished observations.

METHOD OF PIGMENT ANALYSIS

The primary interest in the work reported in the present paper was the effect of storage on the pigment in Alaska shrimp-waste meal. As often happens in studies of this kind, however, a suitable method of analysis must be available before the principle objectives can be attained. The procedure used in the analysis of the pigment is described, and the suitability of the procedure is discussed.

PROCEDURE: The pigment in shrimp-waste meal is determined as follows:

1. Place an accurately weighed sample of shrimp-waste meal of about 2.5 grams in a 100-milliliter centrifuge tube.
2. Add 50 milliliters of acetone. (Baker's analyzed reagent was used in the present work.)
3. Shake the tube mechanically for 15 minutes.
4. Centrifuge the resulting mixture at about 650 times gravity for 5 minutes.
5. Dilute an aliquot suitably for spectrophotometric absorption measurement.
6. Pipette a sample into a 1-centimeter silica absorption cell.
7. Determine the absorption of the acetone extract at a wavelength of 470 millimicrons. (A Model DU Beckman spectrophotometer was used.)
8. Express the absorbency of a 100-milliliter acetone extract of 5 grams of the meal as the pigment index, $E_{1\text{ cm}}^{5\%}$.

SUITABILITY: The simple procedure for acetone extraction and spectrophotometric analysis just described is not specific for astaxanthin, since other pigments absorbing in the region of 470 millimicrons also will contribute to the total absorption and be measured as astaxanthin. One of the oxidation products of astaxanthin is another carotenoid, astacin, for example, which has a similar absorption spectrum but which has been shown to be ineffective in producing color when included in the diet of hatchery trout (Goodwin 1954). Tests therefore were carried out to obtain evidence for the identity of the pigment in shrimp-waste meal and, in addition, to estimate what percentage of the pigments extracted by acetone was made up of astaxanthin. In this way the applicability of the simple extraction procedure to the analysis of astaxanthin in shrimp-waste meal could be evaluated.

Procedure: To identify the pigment in shrimp-waste meal, we followed essentially the methods of Goodwin and Srisukh (1949). These methods consisted of a phasic analysis by partitioning the pigment between 90 percent (V/V) aqueous methanol and petroleum ether (b.p. 30° to 60° C.), separation of the pigments on alumina, and determination of the absorption spectra of the chromatographed solutions in carbon disulfide.

Results and Discussion: The pigment was found to be mainly epiphasic a property of astaxanthin when partitioned between 90 percent (V/V) aqueous methanol and petroleum ether (b.p. 30° to 60° C.). Astacin, an artifact of astaxanthin, is hypophasic between these solvents. Chromatography of the pigment in petroleum ether solution on alumina (Merck, acid washed, for chromatography) indicated that the pigment was esterified astaxanthin, since it was eluted readily with 5 percent (V/V) acetone-petroleum ether. A more polar solvent, 2 percent (V/V) glacial acetic acid-ethanol, was required to elute free astaxanthin from alumina (Goodwin and Srisukh 1949). Astacin, which is more strongly absorbed, would not be expected to be eluted

under either of the aforementioned conditions (Goodwin and Srisukh 1949). A decrease in absorbency after chromatography indicated that the astaxanthin fraction constituted approximately 75 percent of the pigment of the unchromatographed extract. The simple acetone-extraction procedure therefore overestimates the astaxanthin content of shrimp-waste meal.

Absorption spectra of the chromatographed extracts exhibited one absorption maximum at a wavelength of 502 millimicrons in carbon disulfide. This compared favorably with the reported absorption maximum for esterified astaxanthin, namely, 503 millimicrons. The absorption maximum for astacin is 510 millimicrons in carbon disulfide (Goodwin and Srisukh 1949). Attempts to obtain additional evidence for the identity of the pigment by means of color tests (Karrer and Jucker 1950) were unsuccessful.

Pigment from shrimp-waste meal that had been heated over an extended period exhibited absorption at 470 millimicrons; the spectra departed, however, from the characteristic spectrum of astaxanthin in this solvent. Although these meals would have a low pigment content, the analyses could be misleading. Consequently, the development of chromatographic techniques for routine analysis would be desirable. The development of such a method would probably take considerable time, so the simple acetone-extraction procedure was adopted to follow the changes in pigment content of the meals.

STORAGE TESTS

Three experiments were run that had as their objective the determination of the following:

1. Level of antioxidants needed for retention of pigment.
2. Effect of antioxidants and a synergist on pigment retention and retardation of oxidative rancidity.
3. Effect of antioxidants in meals of different moisture content.

Shrimp-waste meals used in these experiments were dried in a forced-convection oven. Fresh, unground shrimp waste was placed on shallow trays and dried for 6 hours at 65° to 75° C. (149°-167° F.). The dried material was ground in a Hobart grinder.

DETERMINATION OF EFFECTIVE LEVELS OF ANTIOXIDANTS FOR PIGMENT RETENTION: Procedure: Samples of shrimp-waste meal weighing 10 grams were treated with either BHT (2,6-ditertiarybutyl-4-hydroxytoluene) or Santioquin (6-ethoxy-2,2,4-trimethyl-1,2-dihydroquinoline) at levels of 0, 0.02, 0.08, 0.32, and 0.64 percent in the meal. This was accomplished by spraying and blending into the meal acetone solutions containing the respective concentration of the antioxidant. The latter samples were transferred to shallow dishes and placed in a current of air for 1 hour to evaporate the acetone. The samples then were placed in an oven maintained at 50° C. (122° F.) and analyzed initially and at weekly intervals for content of pigment.

Antioxidant	Level	Retention of Pigment at End of:			
		168 Hrs.	336 Hrs.	672 Hrs.	696 Hrs.
		(Percent)			
BHT	0	77	56	-1/	-1/
	0.02	75	56	21	-
	0.08	77	58	26	-
	0.32	76	58	30	-
	0.64	81	61	27	-
Santioquin	0	78	64	-1/	38
	0.02	92	80	-	52
	0.08	94	86	-	62
	0.32	95	89	-	71
	0.64	95	90	-	76

1/Not determined.

Results: Results of the test are given in table 1. Santioquin was

effective in retarding pigment losses, whereas BHT-treated samples were similar to controls. The effectiveness of Santoquin appeared to increase with increasing levels of antioxidant in the meal. These results paralleled, in part, previous work on the protection of carotene in alfalfa (Thompson 1950). In the latter study, however, BHT exhibited some antioxidant activity.

EFFECT OF ANTIOXIDANTS AND A SYNERGIST ON PIGMENT RETENTION AND THE RETARDATION OF OXIDATIVE RANCIDITY IN SHRIMP-WASTE MEAL:
Procedure: Samples of meal were treated, as before, with acetone solutions of BHT, Santoquin and citric acid, singly and in combinations, to give a level of 0.02 percent each in the meal. Storage tests were conducted at 60° C. (140° F.). Two ovens were used in order to separate samples that contained Santoquin. (Preliminary studies had indicated that when controls and samples treated with Santoquin are placed in the same oven, an antioxidant effect is observed in the untreated controls.) Samples were taken initially and at weekly intervals for pigment analyses and reaction with 2-thiobarbituric acid (TBA), the reaction with TBA to serve as a measure of oxidative rancidity (Yu and Sinnhuber 1957 and Ryan and Stansby 1959).

Results: Results of these tests are given in table 2. Only those samples that contained Santoquin exhibited a decrease in the rate of destruction of pigment. In addition, Santoquin, but not BHT, was effective in limiting oxidative rancidity (table 3). Since BHT is reportedly an effective fat antioxidant, these results were not expected. A probable explanation for the ineffectiveness of BHT was suggested by the report (Anonymous 1957) that BHT tends to steam distill at elevated temperatures.

Antioxidant Added at the 0.02-Percent Level in the Meal			Amount of Pigment Retained After		
BHT	Citric Acid	Santoquin	1 Week	2 Weeks	3 Weeks
(Percent)					
0	0	0	59	29	19
+	0	0	63	33	23
0	+	0	54	30	21
+	+	0	62	31	21
0	0	+	78	61	49
0	+	+	82	64	50
+	0	+	80	59	48
+	+	+	78	60	48

Antioxidant Added at the 0.02-Percent Level in the Meal			TBA Color (E _{1%} ^{1cm})						
BHT	Citric Acid	Santoquin	1 Week	2 Weeks	3 Weeks	4 Weeks	5 Weeks	6 Weeks	7 Weeks
0	0	0	0.405	0.475	0.562	0.636	0.671	0.730	0.762
+	0	0	0.373	0.449	0.546	0.634	0.690	0.703	0.765
0	+	0	0.406	0.486	0.560	0.620	0.697	0.708	0.765
+	+	0	0.404	0.464	0.547	0.632	0.698	0.732	0.758
0	0	+	0.357	0.341	0.399	0.472	0.487	0.548	0.571
0	+	+	0.338	0.362	0.404	0.446	0.530	0.529	0.527
+	0	+	0.328	0.363	0.409	0.532	0.542	0.592	0.594
+	+	+	0.332	0.381	0.408	0.476	0.542	0.579	0.589

EFFECT OF ANTIOXIDANTS AT DIFFERENT MOISTURE LEVELS IN MEALS:
 A third test was therefore carried out using closed containers and a lower temperature, and included the effect of level of moisture in the meals.

Procedure: Shrimp-waste meals containing 4-percent and 10-percent moisture were treated with either BHT or Santoquin at 0.02-percent level. Samples weighing 20 grams were placed in closed 8-ounce jars and held at 38° C. (100.4° F.). Samples were taken initially and at weekly intervals for pigment and TBA analyses.

Antioxidant	Moisture Content	Retention of Pigment		
		1 Week	2 Weeks	3 Weeks
		(Percent)		
None	4	92	88	81
Santoquin . .	4	96	89	88
BHT	4	91	84	83
None	10	56	39	36
Santoquin . .	10	79	69	66
BHT	10	64	48	43

Results: Results are given in tables 4 and 5. The samples containing 4-percent moisture exhibited lower rates of pigment

loss and less color development in the TBA reaction. The samples containing 10-percent moisture exhibited more rapid rates of decrease in pigment and a marked initial increase in TBA color. After 8 weeks, absorption spectra of the acetone extracts of the meals were obtained. The pigment content of the control and BHT treated 10-percent moisture samples had decreased considerably, and in addition, the spectra in acetone solution were not characteristic of astaxanthin; thus absorbency at 470 millimicrons as an index of astaxanthin content could be misinterpreted. Since extensive

Table 5 - 2-Thiobarbituric Acid (TBA) Reaction for Shrimp-Waste Meal of Different Moisture Contents During Storage at 38° C. (100.4° F.)

Antioxidant	Moisture Content Percent	TBA Color (E _{1%} _{cm.})			
		0 Week	1 Week	2 Weeks	3 Weeks
None . . .	4	0.289	0.284	0.321	0.324
Santoquin .	4	0.311	0.267	0.335	0.286
BHT	4	0.311	0.313	0.326	0.312
None . . .	10	0.419	0.694	0.812	0.806
Santoquin .	10	0.419	0.504	0.622	0.614
BHT	10	0.439	0.657	0.760	0.772

destruction of pigment in the controls and BHT-treated samples had occurred at the end of 8 weeks, such meals would be identified visually as nontypical. It nevertheless would appear desirable to employ chromatographic analysis that would allow both a qualitative and quantitative evaluation of the pigment in shrimp-waste meal.

SUMMARY

Details of a method of analysis sufficiently accurate for the present immediate purposes are given, and evidence that the pigment in Alaska shrimp-waste meal is mainly esterified astaxanthin is presented.

Santoquin, but not BHT, was effective in decreasing both the rate of pigment destruction and the development of oxidative rancidity, the latter as measured by the 2-thiobarbituric acid reaction. Citric acid exhibited no synergistic effect with either Santoquin or BHT under the conditions of this study.

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NEW TECHNOLOGICAL LABORATORY FOR FISHERIES RESEARCH IN GLOUCESTER, MASSACHUSETTS

To meet the needs of the New England fishing industry and to form a center for long-range technological investigations of our marine resources, the U. S. Bureau of Commercial Fisheries opened a new Technological Laboratory in Gloucester, Mass., towards the latter part of 1959.

Back in 1945 a senior technologist was assigned to the New England area to find out what the fishing industry needed in the way of technological research. The result of his study was the establishment of a small laboratory on the Boston waterfront which directed the efforts of a few professional people to the development of a satisfactory method of freezing fish at sea.



Fig. 1 - View of the office wing from the reception hall of the Gloucester Laboratory.

The entire laboratory program is oriented toward providing the knowledge necessary for industry to attain its goal of producing fishery products of a quality as close to that of the freshly-caught fish as is possible. To accomplish this, the technological research program is divided into three major work areas dealing with: (1) the development of standards and specifications for fishery products, (2) preservation and engineering studies both on the vessel and a-shore, and (3) chemical studies on the composition of fish and fishery byproducts, proteins, and flavors and odors.

A team of four chemists and a fishery aid are concentrating on the development of U. S. Standards for Grades and the preparation of Federal Specifications for fishery products. Surveys of current industry production practices and analyses of products form the basis for the development of standards for quality characteristics and effective testing methods. The resulting standards serve as a quality gauge in wholesale buying and selling and assurance to the consumer of an attractive high-grade product. Regular meetings with members of industry at various stages of this program's development have provided opportunity for partnership in the discussions and evaluation of standards as they are prepared.

From this small beginning there was shaped the present staff of 14 professionals trained in chemistry, biochemistry, engineering, fishery technology, and related fields. This seasoned team has recently moved from the ramshackle building that housed the laboratory in East Boston to the new quarters in Gloucester.



Fig. 2 - Library section at the new laboratory.

The Federal Specifications which are developed under this program also assist industry and military and civil agencies by standardizing Federal purchases.

This allows industry to compete for contracts on an even and fair basis, and at the same time assures Federal consumers of good quality fish at competitive market prices.



Fig. 3 - The conference room overlooking the Annisquam River.

fishery products and on new methods of chilling and freezing fish at sea and ashore. The time-temperature-tolerance project is concerned with investigations of the effects of various combinations of temperature, storage time, relative humidity in the storage room, and other factors experienced during distribution on the quality of fishery products. In addition, frozen-storage studies are being conducted on new products from presently underutilized species of fish as a means of establishing new markets for such products. This group is also investigating methods of chilling groundfish in refrigerated sea water as a possible method for extending the edible shelf life of these fish, to provide more efficient handling, and to level out production.

Engineering projects at the laboratory include the design of pilot-model refrigerated sea-water installations for use at the processing plant or aboard a fishing vessel, studies on the freezing of fishery products, and on methods of improving plant and vessel sanitation. These investigations are designed to provide information that will better the economic position of both vessel and plant operators.



Fig. 4 - Installation of furniture in the organic chemistry laboratory.

Chemical investigations into the fundamental quality factors of fishery products are the responsibility of the composition and utilization group. Problems under investigation include the composition of fish, the chemical constituents of the odor and flavor of fish, and the relation between protein denaturation and textural changes during the frozen storage of fish.

The objective of the composition studies is to provide a knowledge of the constituents in fish and of the factors, such as, season and areas which may affect

them. Information produced from these studies will permit the processor of fishery products to accurately calculate his yield and costs. It will also enable the nutritionist and dietician to make recommendations regarding the components of normal and special diets.

Studies of flavor and odor have as their immediate objectives the identification of those compounds that comprise the flavor and odor of fresh fish, and fish that has deteriorated during storage. The ultimate objective of the investigation is to gain an insight into the chemical processes involved during flavor and odor deterioration so that steps can be taken to prevent these reactions and thereby permit fish products to retain their attractive fresh flavor. Another undesirable change that occurs during frozen storage is an increase in toughness of the meat. This problem is under scrutiny in a study of the fundamental order of arrangement of the molecules comprising the protein of fresh and frozen fish. A solution to this problem will be an important contribution to the efforts of industry to increase the acceptability and demand for their frozen fish products.

Another responsibility of this laboratory is that of maintaining supervision of the U. S. D. I. Voluntary Inspection and Grading program in the New England Region. A team of some 14 highly-trained inspectors sample more than 50 million pounds of fishery products annually, thus assuring that the consumer obtains top quality merchandise. Just about every form of frozen, canned, fresh, raw, cooked, uncooked, breaded fish and/or shellfish is inspected at one time or another by this laboratory's inspectors.

Executing Bureau contract research projects and a special service-to-industry project for furnishing direct technological assistance to industry members rounds out a complete technological service.



CHANGE IN MOISTURE PERCENTAGE

Those unacquainted with the reduction of fish are sometimes surprised at the manner in which percentage of moisture varies during the process of evaporation. To illustrate the point, we might take two extreme examples.

For our first one, suppose that we have 100 pounds of a material containing 2 percent moisture, which means that it contains water in the amount of 2 pounds. Now let us evaporate exactly one half of the water, which would leave 1 pound of it. An analysis of the material then would show that it contains 1.0 percent moisture, about what we would expect.

For our second example, suppose that we start with 100 pounds of material containing 98 percent moisture. The material then would contain water in the amount of 98 pounds. Again let us evaporate one half of the water, which would leave 49 pounds of it. What amount of moisture does the material now contain? Reasoning from the first example, we might hazard 49 percent as a rough off-hand guess. Actually, it would contain 96.1 percent, as the following calculation shows:

$$\frac{(98-49)(100)}{100-49} = \frac{(49)(100)}{51} = 96.1 \text{ percent}$$

Thus care must be taken in mentally estimating changes in moisture content.



COMPOSITION OF ROCKFISH

Rockfish are valuable nutritionally because of the large proportion of high-quality protein they contain. These protein-rich fish are very low both in fat and in sodium content. These characteristics make rockfish valuable for use in special diets as well as in normal diets.

Rockfish are economically important in the fresh and frozen fish industry of the Pacific Coast. The total catch of rockfish landed in Washington, Oregon, and California in 1956 was 26 million pounds. During the same year the amounts of some other species of fish landed in the same area were Pacific salmon 54 million, flounder 52 million, halibut 22 million, and Pacific cod 10 million.

The part of the rockfish that is eaten represents about one-fourth of the whole fish. The remainder of the fish is used to feed mink, trout, poultry, and livestock. Because all of the rockfish is used to feed either human beings or animals, it is important to have a true picture of the nutritive value of (1) the edible meat or fillets, (2) the trimmings, and (3) the whole fish.

Chemists at the Seattle Technological Laboratory of the U. S. Bureau of Commercial Fisheries have determined the composition of nine species of rockfish. The fish they analyzed represented differences in size of fish and in method by which the fish were preserved until they were analyzed. The chemists wished to determine the composition of the more important species of rockfish and to discover if the composition varied in relation to these differences in species, size, and treatment.

The composition of the different species of rockfish was found to be quite uniform regardless of the size of fish or whether they were frozen, iced, or prepared as frozen fillets.

The nonedible parts of the rockfish were found to contain more than 5 percent of oil and more than 5 percent of ash. The protein content of these parts was found to average more than 16 percent.

Rockfish, which are low in cost and abundant on the west coast of the United States, constitute a highly nutritive source of protein food.



IRRADIATION PRESERVATION OF PACIFIC COD FILLETS

The storage life of Pacific cod fillets that had been subjected to pasteurization dosages of irradiation and then held at refrigerator temperatures was increased by about three times compared with unirradiated fillets stored at the same temperature. A pasteurization level of irradiation is a level at which most of the bacteria present

are destroyed but does not completely sterilize the food. Pasteurized food must be stored under refrigeration.

Chemical and bacteriological tests made on irradiated fish during storage indicate that the changes taking place in fish after irradiation are different from those that take place in unirradiated fish. This can be attributed to the fact that irradiation alters the type and number of bacteria that survive, and apparently changes the manner in which spoilage takes place. The usual laboratory tests for freshness cannot be used to judge the quality of irradiated fillets of Pacific cod. The judgment of an experienced taste panel therefore was used to compare the quality of the irradiated samples and determine their storage life.

These studies were undertaken by chemists at the U. S. Bureau of Commercial Fisheries Seattle Technological Laboratory in cooperation with the Quartermaster Food and Container Institute for the Armed Forces as a part of their program for determining the potential value of ionizing radiation for the preservation of fishery products.

All of the irradiated samples tended to have a slight radiation odor and flavor, which is described by most tasters as scorched or burnt. The taste panel could not distinguish among samples of cod fillets that had been subjected to pasteurization at several low levels of irradiation. Samples of Pacific cod that had been subjected to large doses of irradiation, however, were judged to be unacceptable.

The approximate storage life of the various samples of cod fillets stored at 32° to 35° F. was as follows:

Control sample (no irradiation). 1 to 2 weeks

0.1-, 0.2-, 0.23-, and 0.46-megarad samples. . 6 to 9 weeks

0.7-megarad samples 6 to 12 weeks

Note: Megarad = 1 million Rads. Rad = The quantity of ionizing radiation which results in the adsorption of 100 ergs per gram of irradiated material at the point of interest. Erg = Unit of energy. 1-foot pound = 1,356,000 ergs.



IT'S FISH 'N' SEAFOOD TIME

The U. S. Bureau of Commercial Fisheries is cooperating with the Commercial Fishing Industry in its first annual industry-wide Lenten Promotion. The theme of the 1960 Lenten promotion, which peaks March 2 to April 17, will be "It's Fish 'N' Seafood Time." Menu variety will be emphasized in advertising, publicity, and merchandising material.

The Bureau has developed and distributed a variety of educational and informational materials for use during this year's Lenten promotion. This includes: A fish-fact bulletin for newspaper food editors and other food publicists; five school lunch bulletins; bulletins for restaurant and institutional use; black and white food photographs for use by the newspaper food editors; and two special animated public service television spots, in 60-, 20-, and 10-second versions, for distribution to the major television stations in the United States. In addition, Bureau marketing specialists and home economists will be appearing on radio and television. Bureau materials will stress menu variety, ease of preparation, nutritional value, and other health benefits accruing from increased use of fish and shellfish in the diet.

TRENDS AND DEVELOPMENTS

Marine Biology Laboratory in Randolph (Mass.) High School

Students in the sophomore class at Randolph High School in Randolph, Mass., a suburb of Boston, are making contributions to marine biology and oceanography through a recently well-organized oceanographic laboratory at the school. The laboratory and its procedures were set up by biology instructor Kenneth Sherman, a former employee of the U. S. Fish and Wildlife Service's Division of Biological Research. The Randolph High School laboratory copies the research methods and problem-solving techniques of the Service's biologists. It is hoped the laboratory will aid in the development of oceanographic scientists for the

future, and at the same time contribute in some small way to ocean science.

The emphasis on ocean research is recent. Here is a frontier of science to challenge the imagination of any alert student. Problems concerning every basic biological concept are present. Here is an environment that presents a great opportunity for original investigation. Little or nothing is known concerning a large number of common marine organisms, especially those which have no particular commercial importance. The physiology, morphology, and ecology of only a small number of marine organisms is now generally understood. There are many gaps in our knowledge concerning the fishes and other marine organisms of the North Atlantic coast. As a result



Fig. 1 - Several members of the Randolph High School oceanographic laboratory staff at work (left to right) Fred Hubble and Robert Merritt are examining plankton collected for their productivity studies. George Fahey is busy checking through the literature concerning the distribution of the tomcod, while Peter McGrath is shown grinding down a bone (otolith) taken from the skull in an effort to observe the growth pattern of annual rings similar to those found in a tree. Everett Schaner is examining the gonads as part of his fecundity study of the same fish.

of this lack of knowledge and increased interest in the oceans, the Randolph High School oceanographic laboratory was formed. The laboratory has given the participating students a unique opportunity to become familiar with research methods and problem-solving techniques.

The laboratory began with a small group of students with high aptitudes and a genuine curiosity concerning the oceans. The students were selected on a competitive basis. The five classes of sophomore biology students were given two lessons



Fig. 2 - Peter McGrath weighing a tomcod as part of his age and growth study.

concerned with the cycle of life in the ocean with particular emphasis on its origin, economic importance, and untapped resources. The students were then required to complete a report of approximately 1,500 words entitled, "The Cycle of Life in the Oceans," using at least three different reference books. Those students that produced the most comprehensive reports were later interviewed and from this group 10 who showed a genuine curiosity, interest, and aptitude were selected to become staff members of the laboratory.

The students were then encouraged to familiarize themselves with the oceanographic literature. They discussed their findings at a meeting where it was generally held that while there were a great many excellent problems to work on, many were impractical from the standpoint of available equipment, time, and the difficulty of securing adequate samples. It was decided to begin the studies with readily available fish which not only provided interesting problems but also the opportunity to secure valuable scientific data.

The investigations currently in progress are concerned with the food habits, fecundity, growth, and distribution of some marine fishes of the Atlantic Coast. One of the studies includes the tagging of the commercially-important cod, *Gadus callarias*, in an effort to determine the distribution pattern. A 16-foot 18-horsepower motorboat is used for tagging along the coast.

Another project is concerned with determining the distribution patterns of the haddock, *Melanogrammus aeglefinis*, by attempting to use the infestation pattern



Fig. 3 - Everett Schaner removing the ovaries of a ripe female tomcod. Later he will determine the total number of eggs contained by this individual as part of his fecundity study.

of attached parasites as natural tags. Students are also working on other problems. The food habits of the winter flounder, *Pseudopleuronectes americanus*, the tomcod, *Microgadus tomcod*, and the Atlantic cod, *Gadus callarias*, are under investigation by individual students. While some fish are collected by hand-lining from the laboratory's 16-foot boat, others are obtained from cooperative fishermen in the local ports of Boston, Cohasset, Scituate, and Hull. Much of the field work is done outside regular school hours.

Fecundity studies requiring careful dissection and measurement of the gonads of the tomcod are in progress. Students are carefully examining, weighing, and classifying the stomach contents of this fish as part of another project. Still another group is concerned with determining the rate of growth of the tomcod. They are studying the various hard body parts and have found that close examination of the otolith bones, which are found in the skull, reveal the presence of annual rings, similar to the growth pattern found in a cross-section of some north temperate trees, which they feel will be useful in age determination of this fish.



Fig. 4 - Fred Hubble (left to right) and Robert Merritt examine samples of plankton taken from surface tows off the coast of Hull Bay, Mass. George Fahey is busy checking the feeding habits of the tomcod for possible correlation with the plankton productivity investigation.

Plankton tows are taken when possible for use in productivity studies of the local coastal area and also for possible correlation with food habits of the fishes under investigation. Samples of sea water are analyzed at the laboratory periodically for phytoplankton, dissolved oxygen, and salinity determination.

Bibliographic work is done by a special library staff of the laboratory which secures the necessary reference books for the various student project leaders.

The students plan to visit the Oceanographic Institutes at Woods Hole, Mass., in the near future. There they will discuss their own work with scientists actively engaged in similar projects for the Hydrographic Office of the Navy and the U. S. Fish and Wildlife Service.

Through these studies, participating students gain a more comprehensive understanding of scientific methods and principles. There are also good indications that a number of these talented students could conceivably contribute in some small way to a better understanding of basic biological principles.



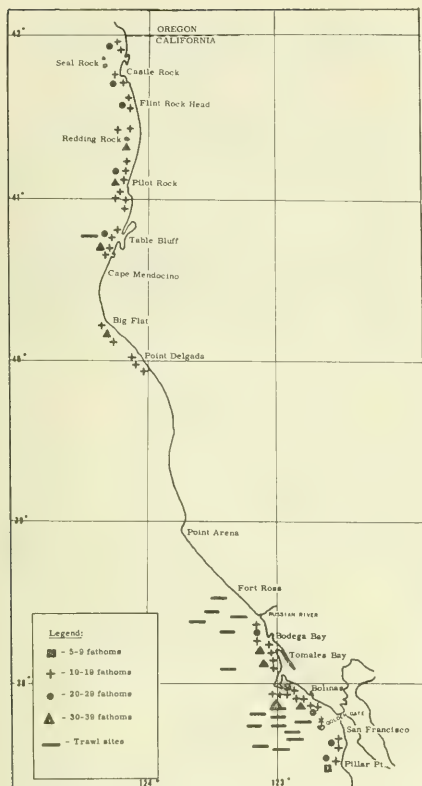
California

CRAB DISTRIBUTION AND ABUNDANCE STUDIES CONTINUED:

M/V "N. B. Scofield" Cruise 5987-Crab: The California coastal waters from San Francisco to Oregon were surveyed (October 15-November 23, 1959) by the California Department of Fish and Game's research vessel N. B. Scofield to determine the distribution, abundance, composition and condition of market or Dungeness crabs within traditional fishing grounds. Other objectives were to conduct exploratory crab fishing in areas lightly exploited by the fishing fleet and to determine the comparative meat yield of hard and soft crabs.

Fifty-two traps of uniform sizes, without escape ports but in every other respect--including baits--comparable to those of the commercial fishery, were employed in depths of 7 to 35 fathoms in 60 separate settings of 16 to 18 traps each. Otter boards and mudlines were utilized on trawling nets of 3½- and 5-inch mesh in 17 exploratory locations at depths of 28 to 120 fathoms. Crabs were captured at each of the 60 trap string locations.

Crabs were taken in 16 of the 17 exploratory trawls. While net sizes, cable meter tests, and technical difficulties affected certain catches, distributional data indicated legal crabs were in depths of 28 to 120 fathoms.



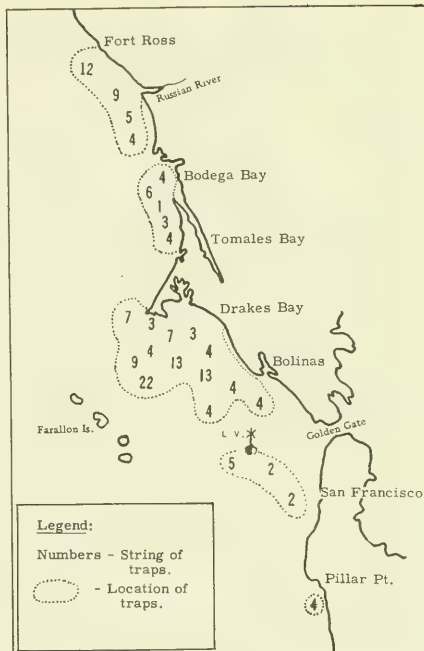
M/V N. B. Scofield Cruise 5957-Crab (Oct. 14-Nov. 25) 1959).

Soft crabs were increasingly abundant to the northward.

Experiments designed to determine the comparative meat yields of hard and soft crabs showed that soft crabs yield 30 percent less cooked meat than hard crabs of the same live weight and size.

A Nansen bottle, reversing thermometer, and bathythermograph were utilized to gather oceanographic and environmental data relevant to the crab fishery.

Airplane Spotting Flight 59-22-Crab: The California coastal waters from Half Moon Bay to Point Arena were surveyed from the air on December 3, 1959, by the Department's *Cessna 182* to determine the



Flight report *Cessna 182*, 59-22-Crab (Dec. 3, 1959).

fishing locations and relative densities of the central California crab fleet.

While conditions for aerial observation were generally good, rising swells and an increasing sun angle diminished visibility from Bolinas Point southward.

In all, 158 strings of traps were counted. The most intensive concentrations occurred from Point Reyes to Bolinas Bay. A majority of the settings were well offshore, many in depths of 30-35 fathoms.

Note: Also see *Commercial Fisheries Review*, February 1959, p. 13, March 1959, p. 31, and July 1959, p. 25.

INVESTIGATION OF ABALONE RESOURCES CONTINUED:

M/V "Nautilus" and Diving Boat "Mollusk" Cruise 59N4-Abalone: The abalone investigations were continued from September 9-October 25, 1959, by the California Fish and Game Department's research vessel *Nautilus* and diving boat *Mollusk* in waters off the southern California

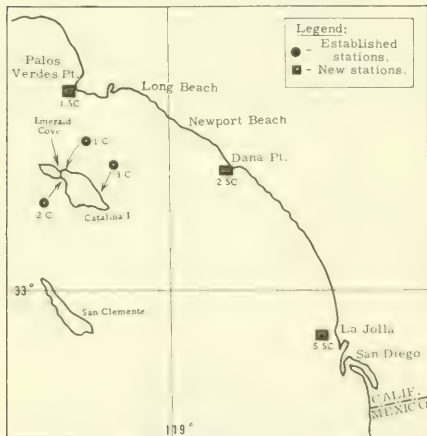
shoreline from Redondo Beach south to San Diego, and Santa Catalina Island. The objectives were (1) to film underwater sequences; (2) to check abalone study stations off Santa Catalina Island; (3) to check areas of commercial diving along coast; (4) to check areas of skin diving along coast; (5) to establish coastal stations for study; (6) to collect specimens of the threaded abalone, *Haliotis assimilis*; and (7) collect and ship black abalone (*H. cracherodii*) to the Hawaii Department of Fish and Game for transplanting at Oahu.

Due to dirty water it was not possible to film the artificial habitat (streetcars) in the Redondo Beach area but pictures were taken of the artificial reef at Emerald Bay, Santa Catalina Island. These motion pictures were for inclusion in a Department film.

The abalone study stations on Santa Catalina Island were checked. Pink abalone tagged in 1958 were recovered and rates of growth were determined. Tags attached in October 1958 appeared to be successfully resisting corrosion and wear. In some instances growth of encrusting algae on the tags was quite heavy. In general the tagged abalone had not moved from the areas in which they had been released; most had not added appreciable growth; some had not grown at all.

The most striking observation was the almost complete absence of kelp (*Macrocystis*) in the station areas. At Station No. 1C on Santa Catalina Island, red abalone (*H. rufescens*) planted in 1956 were found to have moved into deeper water, apparently in search of food.

Areas along the coastline were checked in an attempt to assess commercial and sport diving pressures. However, during the entire cruise water conditions were unfavorable for diving and observations were limited. Stations were established as indicated on the accompanying map.



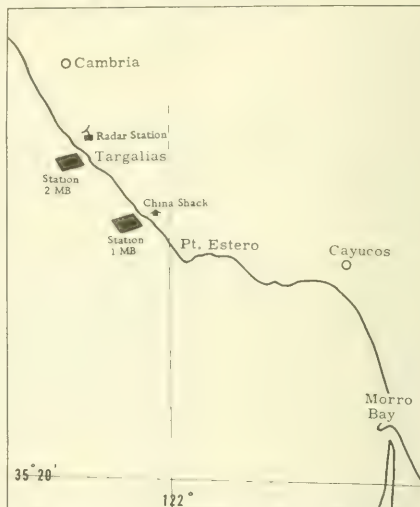
Abalone Cruise 59N4 and 59M3 (Sept. 9-Oct. 25, 1959).

Approximately 400 small ($\frac{1}{2}$ to 3 inches in diameter) black abalone (*H. cracherodii*) were collected and shipped via air to Hawaii. The Hawaii Department of Fish and Game planted them in a restricted area on the island of Oahu.

The investigation was successful in finding specimens of *H. assimilis*, the threaded abalone. These were located just north of Portuguese Bend.

The Nautilus remained at San Pedro at the conclusion of this part of the cruise and the Mollusk was taken by trailer to Morro Bay where field studies were continued.

Diving Boat "Mollusk" Cruise 59M3-Abalone: Investigations were continued in Morro Bay from November 10-December 10, 1959, by the Department's diving boat Mollusk to (1) check abalone study stations; (2) observe conditions on commercial abalone grounds; and (3) tag abalone for growth and habitat studies.



Abalone Cruise (M/V Mollusk only) (Nov. 10-Dec. 10, 1959).

Rough weather limited diving activities to 3 days during this one-month cruise period. Observations revealed a large number of 8-inch abalone in this area and almost all (between 400-500) showed new shell growth. This growth occurred since August 1959 when previous dives were made. *Nereocystis* has returned and is abundant. It extends over a greater area than in the years before its disappearance.

Note: Also see *Commercial Fisheries Review*, December 1959 p. 40.



Cans--Shipments for Fishery Products, 1959

Total shipments of metal cans for fishery products in 1959 amounted to 115,453 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 123,602 tons in 1958, a decline of 6 percent. Shipments of metal cans in 1957 amounted to 114,560 tons and in 1956 totaled 112,532 tons.



The drop in the shipment of cans for fishery products from 1958 to 1959 was due primarily to sharply lower packs of Pacific salmon, California and Maine sardines, anchovies, and shrimp. However, the 1959 pack of tuna set a new record. The over-all pack of principal fishery products (salmon, sardines, tuna, shrimp, anchovies, and mackerel) amounted to about 514.2 million pounds, lower by about 6.2 percent from the 1958 pack (548.4 million pounds) of the same products.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.



Central Pacific

Fisheries Investigations

HAWAII'S SKIPJACK TUNA LANDINGS HIGHER IN JANUARY 1960:

Preliminary figures on Hawaii's landings of skipjack tuna of 144,000 pounds in January 1960 indicate an increase of 40,000 pounds as compared with January 1959. Data are supplied to the U. S. Bureau of Commercial Fisheries Biological Laboratory at Honolulu by the tuna packing industry and the Hawaiian Division of Fish and Game.

Length measurements made on the fish as they are landed at the cannery showed the catches were composed of 4- to 20-pound skipjack with modes at 6, 9, and 20 pounds. Although the sample was small (226 fish), the presence of the 20-pound mode during a mid-winter

month is somewhat unusual. The fishermen reported that there were numerous small schools, and that the fish were often wild and difficult to catch.

* * * * *

NEW UNDERWATER OBSERVATION CHAMBER ADDED TO RESEARCH VESSEL:

During January 1960 a new bow extension, incorporating an underwater observation chamber, was added to the U. S. Bureau of Commercial Fisheries' research vessel Charles H. Gilbert while she was in a West Coast Shipyard. The vessel now equipped for underwater observations from both the stern and the bow, will conduct tuna behavior studies off the coasts of California and Central America in April before returning to Honolulu.

Since 1957, the Bureau's Honolulu Biological Laboratory has been developing equipment and techniques for direct underwater observations of tuna behavior. The first installation aboard the Charles H. Gilbert involved a diver with an aqua lung positioned on an overside ladder. Improvements in the underwater observation techniques led finally to a chamber within the hull of the vessel. By means of visual observations, supplemented with movie and still camera records, studies were made during actual fishing operations, both standard and under various experimental situations.



Conservation

FISH AND WILDLIFE'S ROLE IN NATION'S ECONOMY DISCUSSED AT MEETING:

The role of fish and wildlife in our present economy was explored on January 14, 1960, in a meeting between the Secretary of the Interior and representatives of oil companies and conservation associations. This is the second such meeting, the first having been held about a year and a half ago.

After a welcome by the Secretary, the discussions were launched by a series of remarks by oil company officials, each

explaining what his company was doing in the field of fish and wildlife conservation.

These explanations were followed by discussion of such subjects as the need for future study, planning, and methods of expediting the exchange of information between the companies and the conservation groups.



Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, 1955-59:

Fresh and Frozen Fishery Products: During the calendar year 1959 purchases of fresh and frozen fishery products by the Department of Defense for the use of the Armed Forces amounted to 22.7 million pounds, valued at \$11.6 million. This amount was slightly higher (0.6 percent) in quantity, but was lower by 9.5 percent in value as compared with the preceding year. Prices paid for fresh and frozen fishery products in 1959 by the Department of Defense averaged 51.3 cents a pound, lower by 5.8 cents a pound from the 1958 average of 57.1 cents. This was due mainly to lower market prices for most fishery products in 1959. For the five-year period 1955-59, purchases varied between a high of 26.6 million pounds in 1956 to a low of 22.5 million pounds in 1958. Prices paid per pound jumped sharply from the over-all average of 43.7 cents a pound paid in 1955 to the peak price paid in 1958.

Canned Fishery Products: Purchases of canned fishery products in 1959 were down sharply from the preceding year. Purchases of canned tuna (3.7 million pounds) were down 37.2 percent from the 5.9 million pounds purchased in 1958, canned salmon purchases dropped 67.5 percent, or from 3.3 million pounds in 1958 to 1.1 million pounds in 1959. However, purchases of canned sardines in 1959 of about 1.1 million pounds were up 315 percent from the preceding year and close to seven times the purchases made in 1955. Canned salmon purchases made in 1959 were the lowest in five years, but the pack was the lowest in history. Canned tuna purchases, although down from 1958, were the second highest purchases made in the period 1955-59.

DEPARTMENT OF DEFENSE PURCHASES, JANUARY 1960:

Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Department of Defense, 1.5 million pounds (value \$737,000) of fresh and frozen fishery products were purchased in January 1960 by the Military Subsistence Supply Agency. This was lower than the quantity purchased in December 1959 by 15.7 percent, but was 0.5 percent above the amount purchased in January 1958. The value of the purchases in January 1960 was lower by 15.9 percent as compared with December 1959 and 12.7 percent less than for January 1959.

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, January 1960 with Comparisons

QUANTITY			VALUE		
January	Jan.-Dec.	1959	January	Jan.-Dec.	1959
1960	1959	1959	1960	1959	1959
...	(1,000 Lbs.)	...	...	(\$1,000)	...
1,497	1,459	22,651	737	844	11,624

Prices paid for fresh and frozen fishery products by the Department of Defense in January 1960 averaged 49.2 cents a pound, about 0.2 cents less than the 49.4 cents paid in December 1959 and 7.5 cents less than the 56.7 cents paid during January 1959. The lower average price for purchases this January as compared with January a year ago was due to a sharp drop in fillet, shrimp, and scallop prices.

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, 1955-59

Product	1959		1958		1957		1956		1955	
	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value
Fresh and Frozen Fishery Products	1,000 Lbs.	\$1,000	1,000 Lbs.	\$1,000	1,000 Lbs.	\$1,000	1,000 Lbs.	\$1,000	1,000 Lbs.	\$1,000
	22,651	11,624	22,511	13,85	23,452	12,080	26,610	13,413	24,989	10,929

Table 2 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, 1955-59

Product	Quantity				
	1959	1958	1957	1956	1955
	(1,000 Lbs.)				
Tuna	4,998	5,884	2,711	3,334	2,906
Salmon	1,085	3,330	3,111	2,798	2,785
Sardines	1,051	253	215	236	143
Total	5,334	9,473	6,037	6,368	5,834

* * * * *

Canned Fishery Products: Tuna was the only canned fishery product purchased in quantity for the use of the Armed Forces during January this year. Purchases of canned tuna in January 1960 were up about 17 percent from January a year ago. However, the value of the canned tuna purchases this year was only 42.4 cents a pound as compared with 49.7 cents in January 1959. Note: Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated because local purchases are not obtainable.

Table 2 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, January 1960 with Comparisons

Product	QUANTITY				VALUE			
	January		Jan.-Dec.		January		Jan.-Dec.	
	1960	1959	1960	1959	1960	1959	1960	1959
	... (1,000 Lbs.) ...				... (\$1,000) ...			
Tuna . . .	451	385	3,698	191	192	1,672		
Salmon . .	-	-	1,085	-	-	737		
Sardine . .	6	12	1,051	4	4	177		



Inspection of Fishery Products

OVER 42 MILLION POUNDS PACKED IN 1959 UNDER GOVERNMENT INSPECTION BY SOUTH ATLANTIC AND GULF STATES FISHERY PLANTS:

Inspection and grading services for fishery products became the responsibility of the U. S. Department of the Interior on July 1, 1958. Inspection and grading services are available on a fee basis to processors who meet the existing voluntary Federal standards of quality for fishery products. A U. S. Bureau of Commercial Fisheries inspection corps has been given specialized training and assigned to the fishery plants throughout the country which requested voluntary continuous inspection of their products. This service provides that an inspector or inspectors be stationed at each plant during all shifts of the processing operation. The inspector (a) checks plant personnel and equipment for sanitation, (b) checks the raw material for wholesomeness, (c) checks the processing of the finished products, and (d) selects finished product samples for grading. When the final inspection of the finished product is made, he will issue certificates attesting to the grade or quality and condition of the lot. He also furnishes plant management with a daily inspection report commenting on the sanitary conditions and the results of the products inspection.

Continuous inspection services assure the processor and purchaser of satisfactory compliance with the requirements for wholesomeness of the raw materials used and of sanitation established for the handling and processing operations.

Twenty-nine plants have applied and are now under continuous inspection. Of this total, 14 are located in the South Atlantic and Gulf States. From July 1, 1958 (when continuous inspection of fishery products was started by the U. S. Department of the Interior) through December 1958, a total of almost 11.4 million pounds of fishery products was packed by 10 plants in the South Atlantic and Gulf States. Of this amount, almost 11.2 million pounds was frozen raw

breaded shrimp. In 1959, 14 plants in those states were packing under continuous inspection and in the 12 months of that year a total of 42.3 million pounds of products was packed. Of that total, 36.2 million pounds was frozen raw breaded shrimp.



Marketing

EDIBLE FISHERY PRODUCTS MARKETING PROSPECTS, FIRST QUARTER 1960:

United States civilian per capita consumption of fishery products in 1959 is estimated to have been 10.7 pounds, a little more than a year earlier. The rate for the fresh and frozen products was about the same as in 1958, but there was some increase for the canned items. Current supplies appear adequate to maintain consumption by civilians at about the same rate this winter and early spring as last. A probable gain for the fresh and frozen fishery products is likely to counterbalance a decline for the canned. Retail prices of fishery products averaged somewhat lower than in 1958, when they were record high. Expectations are that prices in the next few months will likely be relatively stable, though averaging lower than a year earlier.

The catch of food fish and shellfish was more than a tenth lower in 1959 than in 1958. The reduction was principally in the species that are canned. Commercial landings were at the low point of the year in the winter and started increasing seasonally in early spring.

Fishery Products Packed in South Atlantic and Gulf States Plants Under U. S. D. I. Inspection

Product	In Pkgs. of Less than 2 Lbs.				In Pkgs. of 2 Lbs. & Over				Total Quantity Pkg'd.	
	12 Mos. 1959		July-Dec. 1958		12 Mos. 1959		July-Dec. 1958		12 Mos. 1959	July-Dec. 1958
	No. Plants	Quantity (1,000 Lbs.)	No. Plants	Quantity (1,000 Lbs.)	No. Plants	Quantity (1,000 Lbs.)	No. Plants	Quantity (1,000 Lbs.)	Quantity (1,000 Lbs.)	
Shrimp, frozen, raw:										
Breaded	14	19,655	10	6,017	14	16,504	10	5,137	36,159	2/11,154
Peeled & deveined	12	1,637	3	99	11	1,066	2	1/	2,703	99
In shell	7	535	1	1/	10	1,312	2	1/	1,847	3/
Total	14	21,827	10	6,116	14	18,882	10	5,137	40,709	11,253
Other products ^{1/}									1,631	108
Grand total									42,340	11,361

1/ Packed by less than 3 plants and included with "breaded."

2/ Includes small quantity of "peeled & deveined" and "in shell" products packed by less than 3 plants.

3/ Includes with "breaded" because packed by less than 3 plants.

4/ Includes specialty shrimp products, crab meat, crab meat stocks, devilled crabs, crab patties, lobster cutlets, lobster steaks, lobster tails, breaded oysters, breaded scallops, catfish, flounder, breaded fish fillets, raw and cooked fish sticks, red snapper tenderloin, snapper fingers, swordfish, and breaded trout fillets.

Note: Plants covered in 1959 were located: 2 in Ga., 5 in Fla., 1 in La., and 6 in Tex.

Production of canned fishery products was around 20 percent lower last year than in 1958. Tuna and mackerel were the only major canned products for which output was higher in 1959. The pack of salmon was a third less than in 1958 and the smallest since 1898. Production of canned salmon has been on the downtrend, particularly in the past decade, because of the scarcity of fish. About a sixth fewer Maine sardines and two-thirds fewer California pilchards were packed last year. Per capita consumption of canned fishery products was maintained at a somewhat higher rate in 1959 than in 1958 by moderately larger imports and by drawing on the large stocks which were on hand at the beginning of 1959. Accordingly, supplies of the canned products available for distribution in the next several months are noticeably lower than a year earlier.

The stocks of frozen edible fishery products were larger this February 1 than last. Stocks represent the primary source of frozen fish and shellfish supplies until the seasonal pickup in the commercial catch in early spring.

Imports of fishery products were moderately larger in 1959 than in 1958. Increases occurred both for the fresh and frozen and the canned products. Exports were up substantially from 1958 because of the sharply increased movement abroad of the canned products--particularly of California pilchards, salmon, and squid. Prospects for the next several months are that imports of fishery products will continue at a high rate, but exports will likely be substantially lower than in the winter and spring of 1959.

This analysis appeared in a report prepared by the Agricultural Marketing Service, U. S. Department of Agriculture, in cooperation with the Bureau of Commercial Fisheries, U. S. Department of the Interior, and published in the former agency's February 25, 1960, release of The National Food Situation (NFS-91).

North Atlantic Fisheries Exploration and Gear Research

WINTER DISTRIBUTION OF WHITING STUDIED:

M/V "Delaware" Cruise 60-1: To investigate the winter distribution of whiting in deep water was the objective of a January 1960 cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware. The cruise was divided into two phases.

PHASE I: Although bad weather hampered fishing operations, 31 successful tows were made in depths ranging from



M/V Delaware Cruise 60-1, Phase I (January 5-15, 1960).

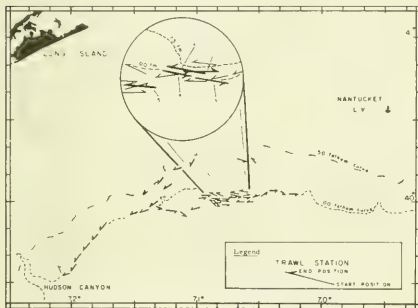
40 to 154 fathoms in selected areas lying near or along the edge of the northern and eastern parts of Georges Bank and in Wilkinson and Murray Basins. In spite of efforts to choose appropriate areas for trawling, three tows resulted in some damage to the net.

Of the better catches was an estimated 2,500 pounds total catch for the No. 36 trawl with liner at trawl station No. 24, with 5,000 and 7,000 pounds for two subsequent tows with the large whiting net in the same area at trawl stations Nos. 25 and 26. These catches consisted of an estimated 2,000, 4,000, and 5,000 pounds of whiting, respectively, with hake (*Urophycis chuss*) making up most of the remainder of the catches. The total catch from the three stations included less than 500 pounds of other fish. These and other tows used the same type of equipment as described above, and were of 45-minute duration.

All of the whiting were M. bilinearis; no M. albidus were taken.

In cooperation with the Woods Hole Oceanographic Institution's study of surface currents, 288 drift bottles were released at 48 locations, and a number of bathythermograph casts were made during both phases of this cruise.

PHASE II: The Delaware found commercial concentrations of whiting (M. bilinearis and M. albidus) in an area extending from lat. $40^{\circ}03'N$, long. $70^{\circ}15'30''W$. to lat. $39^{\circ}33'N$, long. $72^{\circ}08'W$., at a depth of 100 fathoms. In five of the 1-hour exploratory tows, a catch of 15 tons of marketable-size whiting was obtained. The species composition of these commercial tows was predominantly of the common commercial whiting.



M/V Delaware Cruise 60-1, Phase II (January 19-30, 1960).

In the best fishing area, there was a relatively small amount of hake (Urophycis chuss) mixed in with the whiting. Two night tows were made in the area: one tow in the 100-fathom depth had a yield of 5,000 pounds; the other in a 175-fathom depth had 1,000 pounds. Other sections of the area surveyed produced whiting and hake in lesser amounts. A total of 44 tows were made.

During night fishing, nylon gill nets, fished vertically from the surface to a depth of 15 fathoms, were used. Results showed that it is possible to use this method for attempts to sample mid-depth zones; however, fish were not caught during these experimental tests.

Echo-sounder observations indicated considerable quantities of fish near the bottom but none at midwater trawling depth; therefore, midwater trawling was not attempted.

Approximately 1,300 whiting (M. albidus) were preserved by freezing and were turned over to the Woods Hole Biological Laboratory for detailed study. Other preserved specimens included several tilefish (Lopholatilus chamaeleonticeps) of various sizes.

GEAR AND METHODS: A No. 36 trawl (60' head rope, 80' foot rope, $\frac{1}{2}''$ small mesh liner) was used as a try-net. When favorable signs of whiting resulted from tows made with this net, a large commercial whiting trawl (76' head rope, 96' foot rope, 2'' mesh, $1\frac{1}{2}''$ cod end) was towed in the same area. By this method of operation, it was possible to avoid incurring excessive damage to the large whiting trawl during exploratory tows and to compare the fishing effectiveness of the two nets.

NEXT TRIP: The M/V Delaware left Gloucester, Mass., February 11, 1960, for Cruise 60-2. The cruise was to be divided into three phases. The first and third phases were to be conducted under the direction of the Bureau's Biological Laboratory, Woods Hole, Mass., and consist of hydrographic and trawling transects along the coast from Cape Hatteras to Martha's Vineyard.

During the second phase, Exploratory Fishing and Gear Research was to conduct deep-water trawling to extend the area of exploration for red crabs (Ger-yon quinquedens) and other deep-water species of fish and shellfish, investigated during M/V Delaware Cruise 59-7 off the Middle Atlantic area.

The vessel was scheduled to make port in Norfolk, Va., after the first phase and to return to Gloucester on or about February 29, 1960.



North Atlantic Fisheries Investigations

CONTRACT LET FOR DESIGN OF NEW FISHERY RESEARCH VESSEL TO REPLACE "ALBATROSS III:"

The U. S. Bureau of Commercial Fisheries has selected a firm of Boston naval architects to provide architectural services for the design and construction of a new fishery research vessel to replace the *Albatross III*. The *Albatross III* was deactivated in March 1959, because of excessive costs of repair and maintenance. Included in fiscal year 1961 Federal Budget is an item of \$2,055,000, earmarked for the Bureau's new research vessel.

The Bureau's plans call for a vessel 175-180 feet over-all length with a beam of 33 feet, developing 1,600-1,800 hp. and a speed of about 14 knots. Equipment will include laboratories and other facilities necessary to carry out the research and survey work required of the new vessel. The vessel will conduct fishery research in the Northwest Atlantic, with the major emphasis on groundfish species.

It is expected that plans and specifications will be completed in time to award contracts for construction late in 1960.



Oceanography

NATIONAL OCEANOGRAPHIC EXPEDITION BY COAST AND GEODETIC SURVEY VESSEL:

The survey ship *Explorer* began an extensive oceanographic expedition en route from Seattle, Wash., by way of the Panama Canal to Norfolk, Va., February 1, 1960, the Director of the Coast and Geodetic Survey, U. S. Department of Commerce, announced recently. This modern oceanographic cruise will be the first full-scale expedition of its kind by the Survey since historic oceanographic surveys were made by the ship *Blake*, in the early 1880's.

The *Explorer* will extend her normal transfer time from the West to the East coast by more than two months in order to investigate various oceanographic features along the route. The 220-foot long ship is being reassigned for service along the east coast of the United States and will be replaced in the Alaska survey fleet by the new ship *Surveyor* which will soon be commissioned at San Diego.

The expedition is being supported in part by a grant from the National Science Foundation and is a cooperative venture with 12 or more organizations participating.

The Fish and Wildlife Service and the Geological Survey of the U. S. Department of the Interior are vitally interested in this expedition. A geological survey of the Swan Islands will be undertaken; and, for the Fish and Wildlife Service, dredgings to recover bottom-dwelling animals will be made in the Caribbean and in the Straits of Florida. Mammals, reptiles, and insects will be collected on the Swan Islands for the U. S. National Museum of the Smithsonian Institution. An attempt will be made to capture live animals on these islands for the National Zoological Park.

Samples of ocean bottom sediments to be tested for radioactivity will be collected for the U. S. Public Health Service for use in its radio chemical surveillance program.

The U. S. Navy Electronics Laboratory at San Diego will have on board a deep-sea camera for photographing the ocean bottom off the West coast of Central America where the Russian oceanographic ship *Vityaz* reported the bottom to be covered from 80 to 100 percent with nodules of manganese which were also high in nickel and cobalt. It is hoped that the northern boundary of this potential ore deposit can be determined by the deep-sea camera studies.

The Scripps Institution of Oceanography of the University of California is also cooperating in the expedition. Observations will be made at 11 positions off the coast of Oregon in cooperation with Scripps and with Oregon State College. At each station water samples will be obtained to study the distributions of salinity, dissolved oxygen, phosphate, and temperature; all data of importance in determining the oceanographic regime or make up off this coast. In addition, surface water samples will be obtained from which it is hoped that suspended sediment will help oceanographers learn what happens to Columbia River water once it enters the Pacific.

Scripps has provided a magnetometer which will be towed behind the *Explorer* from San Diego to Norfolk. This instrument will provide a continuous record of the earth's magnetic field along the ship's track. This information, coupled with records of the bottom topography, will add considerably to man's knowledge of the intricate magnetic field of the earth. If the magnetometer discovers unsuspected or unexplained magnetic "hills" or "valleys," the ship's plans are such that extra time can be taken to survey the area in more detail.

Throughout the entire expedition current drift bottles will be dropped at regular intervals with cards enclosed asking the finders to inform the Coast and Geodetic Survey where the bottles have been recovered. It is hoped that these bottles will provide clues to the circulation of the waters along the Pacific Coast of North and Central America, of the western Caribbean, and the Gulf of Mexico, and will add to our knowledge of the mighty Gulf Stream.

The ocean's temperature will be taken at hourly intervals throughout the trip. An instrument will

be lowered which will provide the oceanographers with a profile of temperature versus depth.

Oceanographic observations similar to those off the Oregon coast will be made at regular intervals in the Pacific, the Caribbean, Gulf of Mexico, and along the Atlantic Coast.

The bottom sediments along the route will be studied by means of cores and dredges. The shelf around the United States Swan Islands will be extensively studied. These limestone islands cap a small bank that drops off abruptly to the north to depths of over 3,000 fathoms (18,000 feet) in the Cayman Trough. An objective of these investigations is to attempt to ascertain whether these islands are related to the complex of cays (small islands) and banks off Honduras or if the origin is structural and related to the massive Cayman Trough.

It is hoped that dredging for rock on the steep slopes south of the Florida Keys will provide information on the structure of this interesting area.

Of special interest will be measurements of the speed and direction of the Gulf Stream, not only at the surface but at depths down to about 1,500 feet. Observations of this important "river in the sea" will be made at the same location at which Lieutenant Pillsbury, commanding the Coast Survey Steamer Blake, made his classic observations some 70 years ago. The new observations will be made with modern equipment and greatly improved techniques in contrast to the crude and time-consuming methods of Pillsbury's day.

The hills and valleys of the ocean bottom will be under constant surveillance by means of electronic echo-sounding equipment aboard the Explorer. Divers from the Coast and Geodetic Survey will explore the ocean bottom, the fish, and marine plant life around the Swan Islands, and plan to photograph the various instruments in use as they are lowered from the Explorer.

Oceanographic activities have been carried on by the Coast and Geodetic Survey since its earliest years. This latest effort will be an extension of pioneering work in the development of equipment and techniques for making oceanographic investigations.



Outdoor Recreation Resources Review Commission

COMMISSION MEETS WITH ADVISORY COUNCIL:

In concluding the two-day meeting in January 1960 of the Outdoor Recreation Resources Review Commission with its Advisory Council, Chairman Laurance S. Rockefeller said that the Commission is well on its way to completing the job assigned to it by the Eighty-Fifth Congress.

The meeting was called by the Chairman to gather the advice of the Advisory Council in assisting the Commission to become aware of and evaluate the various problems of meeting present recreational needs facing the nation on a Federal, state, and community basis, and anticipating those needs for the years 1976 and 2000.

The meeting in Washington brought together the eight Congressional Commissioners and seven Presidential appointees of the Commission, with the 25 citizens and 14 Federal liaison officers who make up the Advisory Council.

Charles E. Jackson of the National Fisheries Institute is the Commercial Fisheries representative on the Advisory Council. Jackson said, "It is inevitable that commercial fishing rights will be involved in long-range recreational planning. I am impressed with the broad-minded views of the Commission and Council on the necessity of solving conflicts of interests and the need to consider all economic uses of natural resources like fisheries and forestry."



Salmon

KING SALMON RUN OF CENTRAL CALIFORNIA RIVERS LARGEST SINCE 1954:

The largest king salmon spawning run since 1954 in the central California valleys has been recorded in 1959/60 by the California Department of Fish and Game. The Director said some 480,000 salmon spawned in the Sacramento-San Joaquin River system, the most important king salmon spawning area on the West Coast. In 1954, the number was 482,000.

The 1959/60 mark is well ahead of the previous year's 290,000 king salmon spawners and approaches the 500,000 which the Department has said is the number needed to maintain the commercial and sports fisheries at a high level. Previous high in this decade was attained in 1953 when 597,000 spawners were estimated.

The 1959/60 spawners are progeny of those fish which spawned in the 1955/56 winter--the time of the big flood.

While the count this year is the best in five years, the Director said some losses clouded an otherwise bright picture. Most important of these occurred in the Yuba River where the production of some 3,500 salmon, of a very excellent run of 10,000, was lost below Daguerre Point Dam because of water manipulation which resulted in the stranding of salmon nests and ripe salmon.



Shad

CHESAPEAKE BAY SHAD RUN DELAYED BY COLD WATER:

Late in February 1960, Virginia fishermen were waiting impatiently for the 1960 run of shad in the lower part of Chesapeake Bay. But Virginia Fisheries Laboratory scientists pointed out that the seasonal shad run to the rivers would not take place until water temperatures reached about 45° F. A cold February has kept river temperatures 5° F. too low and few shad had appeared as of the end of that month.

Studies made earlier by Virginia fisheries biologists showed that the greatest catches in the York River system have been when water temperatures ranged between 45° and 59° F. Almost no shad have been caught in the York River at water temperatures below 40° F.

In cooperation with the Virginia Fisheries Laboratory, the U. S. Bureau of Commercial Fisheries will again collect catch records on the York River and its tributaries. Fishermen have already been sent log books in which to record their catches and the Bureau biologists will be on the River about mid-March in order to interview shad fishermen and tag fish.

From last year's tagging program, the scientists were able to estimate that 310,000 shad entered the River to spawn and about half of these were caught by the fishermen.

Previous studies done by the Bureau and Virginia biologists has led to the conclusion that overfishing has not been a serious problem in the York River system during the past 20 years and that further protective legislation is not warranted at this time. Thus, shad fishermen have been able to legally catch as many fish as they could use or sell.

Last year's records indicate that the average weight per buck or male shad was 2.3 pounds and for female or roe shad, 3.2 pounds. In 1959, pound nets took about 3 percent of the total catch; fyke nets, 2 percent; haul seines, less than 1 percent; stake gill nets, 48 percent; and drift gill nets 46 percent of the catch. The age of the shad, as determined from scale samples, showed that the catch was predominantly 3- and 4-year old buck shad and 5-year old roe shad. The oldest fish sampled was 7 years old.

Fishermen have been requested to keep careful records of their catches and to return all tags recovered from fishes as soon as possible. A fishery research biologist from Bureau's Beaufort Laboratory, reports that about 300 shad were tagged on the spawning grounds in 1959 in an attempt to determine if York River shad return to the same stream to spawn in successive years. Fishermen were requested to keep a special look-out for these tags to enable the biologists to complete this phase of their work.



Shrimp

COMPREHENSIVE ECONOMIC STUDY BEGINS:

A comprehensive economic study of domestic shrimp industry production has been inaugurated by the U. S. Bureau of Commercial Fisheries. The study will deal with an intensive analysis of competitive conditions in the industry. A declining trend in catch per vessel and increased foreign competition were noted in an earlier study.¹ These trends will be studied in more detail.

¹ Published as Special Scientific Report-Fisheries Nos 277 and 308, *Survey of the United States Shrimp Industry*.

The objectives of the long-range study are to determine the position of the domestic shrimp industry in relation to foreign-based shrimp industries; to examine economic trends in the domestic shrimp industry; to analyze special problems retarding productivity; to recommend measures to solve or mitigate such problems.

The first phase of this study will be done by the University of Florida under a contract from the Bureau. The objectives of this phase are to assess the efficiency of vessel and boat operations in the principal shrimp fisheries of the South Atlantic States and the Gulf of Mexico area; and to appraise each fishery as a potential source of supply, bearing in mind the factor mentioned above and port facilities, labor available, navigational hazards, shore facilities for processing, refrigeration, and transport. This phase of the study will be conducted in the shrimp fisheries in North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas.

Information already available in the files of the Bureau of Commercial Fisheries, data from Federal Trade Commission studies, and from vessel documentations at the Bureau of Customs will be available for the study.

The reason for the study is the economic distress in which the shrimp industry now finds itself, despite the fact that it holds first place in dollar value of all United States fishery products. During World War II and the early post-war years, the domestic shrimp industry prospered. The shrimp catch, which was 143 million pounds in 1938, jumped to 200 million pounds by 1951. Since then it has consistently held to more than 200 million pounds but at no time has it reached the 1954 peak of 268 million pounds.

Improved processing and better markets led to an expansion of demand and, in turn, location of some new fishing grounds, a sharp increase in the number of fishing vessels, and improvements in both equipment and methods of fishing. Even with more vessels at work, there has been a decline in total landings since

1954. This decline in average rate of catch per vessel has resulted in an increase in unit costs of production.

The contract with the University of Florida is financed with funds made available by the Saltonstall-Kennedy Act of 1954. Under the contract terms not more than \$16,400 will be spent on Phase I of the study. This phase is to be completed by December 15, 1960.



Standards

HEARINGS ON PROPOSED STANDARDS FOR FROZEN RAW HEADLESS SHRIMP:

Five open meetings were scheduled in March for hearings on the proposed United States Standards for Grade for Frozen Raw Headless Shrimp. The meetings were held in Jacksonville, Fla., New Orleans, La., Corpus Christi, Tex., Los Angeles, Calif., and Chicago, Ill., and conducted by technologists of the U. S. Bureau of Commercial Fisheries. An invitation to attend the hearings was extended to packers, brokers, distributors, users, and others interested in the grade standards for frozen raw headless shrimp.



Tagging

RADIOACTIVE FISH TAG USE LICENSED BY ATOMIC ENERGY COMMISSION:

On February 16, 1960, the Atomic Energy Commission issued a license to the U. S. Bureau of Commercial Fisheries for the use of a new low-level radioactive fish tag to be used in Southeastern Alaska herring migration studies. The new tag, like the old type, is inserted in the body cavity of the herring, but being radioactive, is much more speedily and accurately recovered by special detectors at the processing plant. Thousands of herring will eventually be tagged, released, and then caught again at a later date by fishermen who deliver them to the processing plant. Fish tagged with the radioactive "belly insert tag" are

immediately detected at the plant, recovered, measured, and aged. In this way the strength of year-classes or populations, and the migrations of these fishes may be determined for management purposes. It is not known at present when the tagging program will get under way.

It is unlikely that the public would ever come into contact with the new tag because of many precautionary measures. Even so, the tags are of such low-level radioactivity that no hazard exists.



United States Fishing Fleet^{1/} Additions

JANUARY 1960:

A total of 16 vessels of 5 net tons and over was issued first documents as fishing craft during January 1960--a decrease

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft by Areas, January 1960

Area	January		Total
	1960	1959	
	(Number)		
New England	1	2	15
Middle Atlantic	1	-	12
Chesapeake	5	9	106
South Atlantic	3	8	76
Gulf	4	6	135
Pacific	2	3	97
Great Lakes	-	1	6
Alaska	-	-	32
Total	16	29	479

Note: Vessels have been assigned to the various areas on the basis of their home ports.

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft by Tonnage, January 1960

Net Tons	Number
5 to 9	7
10 to 19	3
30 to 39	3
40 to 49	3
Total	16

Gulf with 4, and the South Atlantic with 3. The Pacific, the New England, and the Middle Atlantic areas accounted for the remaining 4 vessels.

^{1/} Includes both commercial and sport fishing craft.



U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, DECEMBER 1959:

Imports of edible fresh, frozen, and processed fish and shellfish into the United States during December 1959 increased 12.5 percent in quantity and 6.4 percent in value as compared with November 1959. The increase was due primarily to higher imports of groundfish fillets and blocks (up 2.4 million pounds), frozen albacore and other tuna (up 9.8 million pounds), and to a lesser degree, an increase in the imports of Canadian lobsters and fillets other than groundfish. The increase was partly offset by a 3.4-million-pound decrease in the imports of canned tuna in brine, fresh and frozen salmon (down 3.4 million pounds), and canned salmon (down 1.6 million pounds).

United States Foreign Trade in Edible Fishery Products, December 1958 with Comparisons

Item	Quantity		Value	
	December 1959	December 1958	December 1959	December 1958
	(Millions of Lbs.)		(Millions of \$.)	
Imports:				
Fish & shellfish:				
Fresh, frozen, & processed ^{1/}	97.8	78.9	956.8	28.2
Exports:				
Fish & shellfish:				
Processed/only (excluding fresh & frozen)	5.5	4.4	41.2	1.5
				1.2
				15.6

^{1/} Includes pastes, sauces, clam chowder, and juice, and other specialties.

Compared with December 1958, the imports in December 1959 were up 24.0 percent in quantity and 20.5 percent in value due to higher imports of frozen albacore tuna (up 7.1 million pounds), groundfish fillets and blocks (up 7.8 million pounds), and canned tuna in brine (up 3.6 million pounds). Compensating, in part, for the increases was a drop of about 3.5 million pounds in the imports of frozen tuna other than albacore, fresh and frozen salmon (down 1.1 million pounds), and canned salmon (down 1.0 million pounds).

United States exports of processed fish and shellfish in December 1959 were lower by 43.0 percent in quantity and 66.7 percent in value as compared with November 1959.

* * * * *

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1960 at the 12½-percent rate of duty had not been determined as of March 14, 1960. The quota for 1959 was 52,372,574 pounds. Any imports in excess of the quota are dutiable at 25 percent ad valorem.

Imports from January 1-February 27, 1960, amounted to 5,168,179 pounds, according to data compiled by the Bureau of Customs.



Wholesale Prices, February 1960

WHOLESALE PRICES, FEBRUARY 1960:

In February this year wholesale prices for edible fishery products (fresh, frozen, and canned) at 121.8 percent of the 1947-49 average were about unchanged from the preceding month. Increases in wholesale fresh and frozen shrimp prices were just about offset by lower prices for drawn and filleted haddock. From February a year ago to this February over-all wholesale fishery products prices were down by 8.9 percent due to lower prices for a majority of the items that make up the index, particularly haddock and shrimp.

The weaker market for haddock at Boston, which has been evident during past few months, continued into February this year. Landings of both large and small haddock through February this year were lower than in the same period a year ago, but the sharply higher inventories of frozen haddock fillets and other fillets continued to depress the market for fresh fish at New England ports. The drawn, dressed, and whole finfish subgroup index declined one percent from January to February this year due to a 5.1-percent drop in the price for large drawn haddock and a drop of about one cent a pound for frozen dressed halibut. These declines were just about offset by increases in wholesale prices for frozen king salmon, round whitefish, and yellow pike. Compared with February a year ago, the subgroup index was down by 14.9 percent due to lower wholesale prices for all the items that make up the group. The sharpest price declines occurred in drawn haddock (down 43.2 percent) and in dressed halibut (down 12.0 percent).

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, February 1960 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/		Indexes			
			(\$)		(1947-49=100)			
			Feb. 1960	Jan. 1960	Feb. 1960	Jan. 1960	Dec. 1959	Feb. 1959
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					121.8	121.9	122.7	133.7
Fresh & Frozen Fishery Products:					134.9	135.1	136.4	157.9
Drawn, Dressed, or Whole Finfish:					147.2	148.7	154.8	170.9
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.12	.13	120.9	127.4	163.9	212.8
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.29	.30	90.3	93.8	96.4	102.6
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.77	.77	172.5	171.9	171.3	173.0
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.75	.65	185.9	159.9	115.3	190.9
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.68	.80	136.6	161.9	177.0	161.8
Yellow pike, L. Michigan & Huron, rnd., fresh .	New York	lb.	.73	.71	170.0	166.5	138.4	173.5
Processed Fresh (Fish & Shellfish):					134.5	135.8	134.6	151.1
Fillers, haddock, sml., skins on, 20-lb. tins . .	Boston	lb.	.41	.44	139.5	140.0	166.7	205.9
Shrimp, lge. (26-30 count), headless, fresh . .	New York	lb.	.71	.68	112.2	106.6	101.9	145.3
Oysters, shucked, standards	Norfolk	gal.	6.63	7.00	163.9	173.2	173.2	148.5
Processed, Frozen (Fish & Shellfish):					110.2	107.9	106.8	137.4
Fillers: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.38	.38	98.1	98.1	98.1	108.6
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.31	.31	97.3	97.3	97.3	131.8
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.28	.27	110.8	108.8	108.8	124.9
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.68	.65	104.1	100.3	98.4	133.8
Canned Fishery Products:					103.8	103.8	103.8	98.8
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs. .	Seattle	cs.	24.50	24.50	127.8	127.8	127.8	116.1
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	10.80	10.80	77.9	77.9	77.9	79.3
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	8.00	8.00	93.9	93.9	93.9	86.6
Sardines, Maine, keyless oil, No. 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.75	8.75	93.1	93.1	93.1	87.5

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

Fresh processed fish and shellfish wholesale prices in February 1960 were down 0.6 percent from the preceding month. An increase of 5.3 percent in fresh shrimp prices at New York City was more than offset by a drop of 5.7 percent in fresh haddock fillet prices and a 5.4-percent drop in fresh shucked oyster prices. A decline of 11.0 percent occurred in the subgroup index from February last year to February this year due to sharp price drops of 32.2 percent for fresh haddock fillets and 22.8 percent for fresh shrimp. However, during the same period shucked oyster prices rose 10.4 percent.

The wholesale price index for frozen processed fish and shellfish in February 1960 was higher by 2.1 percent as compared with January this year. Frozen shrimp prices increased (about 3 cents a pound) and frozen ocean perch fillets were up about 1/2 cent a pound in February as compared with the preceding month. From February last year to February this year the subgroup index was down 19.8 percent, due primarily to a 26.2-percent decline in frozen haddock fillet prices and a 22.2-percent drop in frozen shrimp prices. In addition, frozen flounder and ocean perch fillets were lower by 9.7 percent and 11.3 percent, respectively.

From January to February this year wholesale canned fish prices were unchanged. The index for the canned subgroup has moved over a narrow range of less than 1 percent since August 1959. As compared with February a year ago, primary canned fish prices in February this year were higher by 5.1 percent. In February 1960, prices were up 10.0 percent for canned pink salmon, 6.4 percent for Maine sardines, and 8.4 percent for California sardines. However, canned tuna prices in February this year were down 1.8 percent from February a year ago. As of the end of February this year, canned tuna was the principal canned fish with substantial stocks. Stocks of Maine sardines were light. Stocks of both California sardines and Pacific salmon were extremely light with 5-8 months remaining before new packs become available.



Virginia

FISH EGGS AND LARVAE SURVEYS IN OCEAN WATERS CONTINUED:

The biologists of the Virginia Fisheries Laboratory, Gloucester Point, aboard the M/V Pathfinder continued surveying the ocean waters off Virginia's coast for fish eggs and larval fishes during January 1960.

The biologists reported large numbers of what appeared to be larval menhaden in the water 30-40 miles offshore. On the first cruise to ocean waters in December 1959, large numbers of fish eggs were collected and an abundance of larval flounders less than $\frac{1}{8}$ -inch long. Hake larvae were also abundant, but only one larval croaker was collected. One of the puzzles which the Laboratory is trying to solve is the location of the spawning grounds and movements of croakers, spot, and other important fish.

Water temperatures off the coast in the third week of January were between 40° and 45° F. and surface temperatures in Virginia eastern shore inlets were about 34° F.

Note: Also see Commercial Fisheries Review, February 1960 p. 33.



TWO OF 1959'S "TWENTY BEST" SANDWICHES FEATURED FISH

Since 1956, the National Restaurant Association and the Wheat Flour Institute have sponsored an annual National Sandwich Idea Contest and "August is Sandwich Month" promotion. More than 800 entries were received in 1959 from restaurant owners and employees. From these the 20 best new ideas for sandwich combinations were picked and presented at the National Restaurant Convention at the Navy Pier in Chicago. The sandwich ideas were scored on the basis of practicability, suitability to various types of restaurant service, appearance, newness, and flavor. Two of 1959's "twenty best" sandwiches featured fishery products, whereas 5 of the 20 featured fish in 1958.



International

PACIFIC HALIBUT COMMISSION

HALIBUT REGULATIONS FOR 1960:

Fishing for halibut will begin May 1 in all North Pacific areas except in waters west of the Shumagin Islands, according to the recommendation of the International Pacific Halibut Commission to the governments of the United States and Canada. The 1960 regulations are almost the same as those in effect in 1959. In light of the scientific findings and discussions with the industry, the Commission is recommending to the two Governments the following regulations for the 1960 season:

Fishing areas shall be the same as in 1959: Area 1A--south of Heceta Head, Oreg.; Area 1B--between Heceta Head and Willapa Bay, Wash.; Area 2--between Willapa Bay and Cape Spencer, Alaska; Area 3A--between Cape Spencer and Shumagin Islands; Area 3B--waters west of Area 3A, including Bering Sea.

Opening date for halibut fishing in all areas except Area 3B shall be May 1 (at 6:00 a.m.).

Opening date for halibut fishing in Area 3B shall be at 6:00 a.m. April 1.

In Area 1A there shall be one fishing season, without catch limit, extending from May 1 to 6:00 a.m. October 16 or to the closure of Area 3A, whichever is later.

In Area 3A there shall be one fishing season, with a catch limit of 30 million pounds, commencing on May 1 and terminating at the time of attainment of the catch limit.

In Area 3B there shall be one fishing season, without catch limit, extending from April 1 to October 16 or to the closure of Area 3A, whichever is later.

In Area 2 there shall be two fishing seasons throughout the entire area.

In Area 2 the catch in the first season shall be limited to 26.5 million pounds. The second fishing season in Area 2 shall begin at 6:00 a.m. September 11, for a period of 7 days without catch limit.

In Area 1B there shall be two fishing seasons, identical in duration to those in Area 2, and without catch limits.

The grounds in Area 2 off Masset at the north end of Queen Charlotte Islands and off Timbered Islet off the west coast of Prince of Wales Island in southeastern Alaska, which were closed for a number of years prior to 1958, shall be open to fishing in 1960 as in 1959.

The Halibut Commission is responsible to Canada and the United States for the investigation and regulation of the halibut fishery of the northern Pacific Ocean and Bering Sea. Its specific function is the development of the stocks of halibut to levels that will permit the maximum sustained yield, and its decisions regarding regulations are based upon the findings of its scientific staff.

During the past 28 years of Commission management, there has been progressive improvement of the stocks and an increase in annual yield. The annual catch which had declined to 44 million pounds in 1931, the year before regu-

lation, has averaged more than 66 million pounds during each of the past four years. The 1959 catch of 71.5 million pounds was worth nearly \$13 million at the vessel level.

The International Pacific Halibut Commission concluded its Thirty-Sixth Annual Meeting late in February at its headquarters at the University of Washington, Seattle, with Chairman William M. Sprules of Ottawa, Ontario, presiding.

Other members of the Commission are Andrew W. Anderson of Washington, D. C., Vice Chairman, and Mattias Madson and William A. Bates representing the United States; and Harold S. Helland and Richard Nelson representing Canada.

Andrew W. Anderson of Washington, D. C., was elected Chairman and Dr. William M. Sprules of Ottawa, Ontario, Vice Chairman for the ensuing year.

The Commission reviewed the past year's fishery and the research conducted by its scientific staff at its meeting. It dealt with administrative matters and approved a research program for 1960. In the course of its sessions the Commission conferred not only with its staff, but also with representatives of the halibut fishermen's, vessel owners' and dealers organizations, and with its Industry Advisory Group consisting of representatives of each of the foregoing segments of the industry. The scientific findings and all suggestions for regulations in 1960 were discussed at these meetings. In addition the Commission also conferred with representatives of the federal enforcement agencies of both countries regarding their plans for expansion of such activities on different sections of the Pacific Coast.

The Commission also announced that the 1961 Annual Meeting will take place at Prince Rupert, British Columbia.

Since in the past the United States and Canadian governments have accepted the recommendations of the Commission without changes, it is fairly certain that the 1960 regulations as recommended by the Commission will be approved by the two governments.

FOOD AND AGRICULTURE ORGANIZATION

U. S. PROPOSALS FOR WORLD CONFERENCE ON TUNAS AND NUTRITIVE VALUE OF FISHERY PRODUCTS ACCEPTED:

The United States Delegation to the Tenth Session of the FAO Conference (held in Rome, October 31-November 20, 1959) reports that:

"The Conference recognized the value of holding world conferences in various fishery fields as a potent means of furthering the objectives of FAO; the reports of these conferences of experts formed the basis for creative action, and determined the direction that future activities should take.

International (Contd.):

"Two major proposals by the United States Delegation were accepted and written into the report of the Conference. The first proposal, dealing with a world conference on the biology of tunas, was received favorably by all delegates, and the suggestion was made that the conference be held in Hawaii, because it is a major center for research of tunas, and has excellent facilities for a conference. In the absence of specific authority for the United States Delegation to issue an invitation, the time and place of this conference were left to the Director General to work out, in consultation with interested governments. The other proposal, dealing with a symposium on the nutritive value of fishery products, was also received favorably, and the Committee has requested the Director General to go into the possibility of organizing this symposium as a joint activity of the Fisheries and Nutrition Divisions, subject to the availability of funds."

MARINE OILS

ESTIMATED WORLD PRODUCTION, 1957-60:

World production of marine oils (includes whale and sperm whale oils and fish and fish-liver oils) in 1960 is expected to be about 3 percent above 1959 mainly because of a larger crop of whale oil from the 1959/60 Antarctic whaling season. Catch goals announced by the nations participating in Antarctic whaling total 17,500 blue-whale units, an increase of 2,200 units over 1958/59. The production of sperm oil this year is not expected to rise, since prices received for the 1959 production were relatively low.

Table 1 - Estimated World Production of Marine Oils, 1957-60				
Marine Oils	1960/1	1959/2	1958	1957
	... (1,000 Short Tons) ...			
Whale	440	415	435	440
Sperm whale	125	125	135	110
Fish (including liver)	500	490	470	485
Total	1,065	1,030	1,040	1,035
1/Forecast.	2/Partly forecast.			

Fish oil production may be up slightly if the Norwegian winter and spring herring catch in 1960 recovers from the low levels of 1958-59. (Foreign Crops and Markets, U. S. Department of Agriculture, January 28, 1960.)

NORTH PACIFIC FUR SEAL COMMISSION

THIRD ANNUAL MEETING:

The North Pacific Fur Seal Commission adjourned its third Annual Meeting on January 27, 1960. The meetings were marked by a spirit of cooperation among the four participating delegations from Canada, Japan, U. S. S. R., and the United States. Each country on the Commission is represented by a Commissioner and Advisers. The Commission, which was established under the provisions of the 1957 Interim Convention on Conservation of the North Pacific Fur Seals, signed at Washington on February 9, 1957, had opened its third Annual Meeting in Moscow on January 25.

The Commission has as its major responsibility investigation of the fur-seal resources of the North Pacific Ocean. The objective of this investigation is to determine the measures which will make possible the maximum sustainable yield from these resources, with due regard for their relation to the productivity of other living marine resources in the area. In accordance with plans developed by the Commission at its first and second meetings, research agencies of the four Governments are carrying on research at sea, while United States scientists carry on research on the breeding grounds on the Pribilof Islands in the Eastern Bering Sea, and Soviet scientists do similar work on the Commander Islands in the Western Bering Sea, and on Robben Island in the Okhotsk Sea. The investigations are concentrated on dynamics of the fur-seal populations, distribution and migration at sea, feeding habits, and harvesting methods.

In the course of its deliberation, the Commission reviewed the results of the 1959 scientific research programs of the four Member Governments--Canada, Japan, the Union of Soviet Socialist Republics, and the United States--regarding the fur seals of the North Pacific Ocean.

It particularly noted the favorable growth of the Robben and Komondorski herd and the progress being made on the Pribilof herd management program introduced in 1957 to develop the maximum sustainable yield from that herd. The 1959 research work revealed that young

International (Contd.):

tagged seals from the Pribilof Islands occurred in some numbers on the Commander Islands. A few Pribilof tagged fur seals even went as far afield as Robben Island west of Sakhalin. The Commission also approved a coordinated plan for research during the 1960 season.

The Japanese Commissioner was elected Chairman of the Commission to serve through the next Annual Meeting and the U. S. S. R. Commissioner was elected Vice-Chairman.

It was agreed that the next Annual Meeting of the Commission would be held in Tokyo beginning January 30, 1961.

Investigations at sea will begin in early February 1960 on both sides of the Pacific. Investigations at the rookeries will begin in the early summer as the seals arrive at the end of their annual migration to the breeding ground.

Under the provisions of the Interim Convention, commercial harvesting of seals at sea is prohibited. All harvesting is done on the breeding grounds under the control of the United States on the Pribilof Islands, and under the control of the Soviet Government on Robben Island and the Commander Islands.

Note: See Commercial Fisheries Review, February 1959, p. 46.

ORGANIZATION FOR EUROPEAN ECONOMIC COOPERATION TO BE REORGANIZED

At the regular Ministerial Meeting of the Organization for European Economic Cooperation and also at special meetings held in Paris, January 12-14, 1960, an agreement was reached by the 20 Organization for European Economic Cooperation governments to replace the OEEC with a new organization in which the United States and Canada could participate as full members. Under the present organization, both are associate members.

Upon his return to Washington, Under Secretary of State Douglas Dillon, who represented the United States at the meetings, issued the following statement:

"... At these special meetings the 20 governments reached decisions which are of great potential importance for the future of economic cooperation in the Free World. Agreement was reached to work together for the establishment of a successor organization to the OEEC (Organization for European Economic Cooperation) in which the United States could participate as a full member and which would facilitate cooperation between the industrialized nations of the Free World in meeting the major economic problems which will face the world during the coming decade.

"As a result of the Paris decisions we also have reason to expect that a serious and successful effort will now be made to solve the problems of European trade connected with the European Economic Community, and the European Free Trade Association--the Six and the Seven. We have obtained assurances that any solution will take full account of the interests of the United States and other countries in accordance with the principles of the General Agreement on Tariffs and Trade.

"Also during the Paris meetings the governments of a number of capital exporting nations agreed to consult together on their efforts to provide development assistance to the less developed areas. This group will probably hold its first meeting in Washington in the near future."



Australia

GOOD CATCHES ON NEW SHRIMP GROUNDS REPORTED:

Australia's chartered exploratory fishing vessel Challenge towards the end of 1959 reported the discovery of a shrimp fishing area off Cape Moreton. A report from the Challenge, covering work during the third week of November 1959, says:

Shrimp were obtained in all depths between 20-32 fathoms, the most productive depths being 27-32 fathoms. In over 32 fathoms shrimp were obtained, but the ground carries large quantities of starfish.

Australia (Contd.):

One drag on November 19 of 60 minutes yielded 70 pounds of king shrimp in a depth of 32 fathoms. Size range was from 3-9 inches and averaged 6-7 inches (heads on). Drags were made out to 80 fathoms but no shrimp were found.

The area tested extends at least 15 miles from northeast to northwest of Cape Moreton.

The Challenge later fished the area in company with 7 trawlers which had had difficulty in finding the ground. Catches for those vessels ranged from 400-700 pounds of king shrimp for the night. Some 170 pounds of king shrimp were taken by the Challenge using an American balloon trawl.

Leaving Cape Moreton, the Challenge trawled east of Moreton, Stradbroke, and South Stradbroke Islands in depths to 80 fathoms. Only a small quantity of shrimp was taken. The area showed reasonably good trawlable ground which could hold shrimp.

Between November 28 and December 8 the Challenge worked from Southport to Tweed Heads, Byron Bay, and Ballina.

The bottom between Southport and Tweed Heads seemed unsuitable for trawling, but off Ballina, in 44-45 fathoms, 15 pounds of king shrimp were obtained. It was the best show of king shrimp found in over 40 fathoms. It was intended to work the area at night. The ground appeared to be hard. (Australia Fisheries Newsletter, January 1960.)

RESTRICTIONS ON IMPORTS OF SOME FISHERY PRODUCTS REMOVED:

In another step towards normal world trading, Australia has removed restrictions on imports of fresh, chilled, and frozen fish from the dollar area. Australia makes the fourth country (others are Italy, United Kingdom, and France) which liberalized restrictions on the imports of some fishery products from the dollar area during 1959 or early 1960. In November 1959, Australia lifted restrictions on imports of fresh and frozen salmon.

SHRIMP INDUSTRY:

Although the Australian Government and the fishing industry are interested in expanding both the shrimp catch and exports, expansion of the shrimp industry has been slow. At an estimated catch level of 6.5 million pounds (heads on) in the fiscal year ending June 30, 1960, the landings would be down slightly from the preceding fiscal year total of 6.8 million pounds.

Fishing Fleet: There are about 150 vessels engaged full time in the Australian shrimp fishery. These vessels range in size from 30-60 feet in length with motors up to about 350 horsepower. During the peak shrimp fishing season, the fleet increases to about 200 vessels.

Ex-Vessel Prices and Costs of Production for Export: Prices being paid to the vessels for exportable sizes of shrimp (mostly 21-25 and 26-30 count) were from 39-42 U.S. cents a pound. Catches of shrimp are sold ungraded. Total costs for processing shrimp for export amount to about 23-24 cents a pound, including all costs to point of shipment other than storage at point of export. This latter cost, if incurred, would increase the total cost by 1 or 2 cents a pound. Additional costs to the distributor's level in the United States would include ocean freight, insurance, handling, storage, and broker's commission.

Export Trade in Shrimp: Australian statistics do not list the value of shrimp exports as those exports are combined with exports of other shellfish in the export statistics. The Australian Fisheries Division of the Department of Primary Industry estimates that exports for the fiscal year ending June 30, 1960, will be about 450,000 pounds of headless shrimp, or about 5 percent higher than the 1958/59 fiscal year exports of 427,000 pounds.

Export Controls and Taxes: There are no taxes or other export restrictions imposed on the shrimp exported from Australia. Under the Exports Regulations, shrimp must be processed in an establishment approved by the Government. The regulations prescribe certain sanitary requirements, freezing times, and maximum temperatures for freezing and storage. Inspectors for the Government insure compliance with the regulations.

Table 1 - Australia's Landings and Value of Heads-On Shrimp by Species, 1956/57-1958/59

Fiscal Year 1/	Species of Shrimp						Total	
	Green Tail	School	Tiger	King	Banana	Other	Quantity	Value 2/
	(1,000 Lbs.)						±A	US\$1,000
1958/59	680	2,092	679	2,280	974	46	6,751	943,000
1957/58	882	970	627	1,530	647	37	4,447	796,418
1956/57	882	1,476	303	1,780	793	30	5,076	851,423
1955/56	511	2,070	336	2,092	1,138	-	6,148	763,267

1/ Fiscal year July-June.

2/ Australian pounds converted at rate of US\$2.24=1 ±A.

Australia (Contd.):

Table 2 - Australia's Exports^{1/} of Headless Shrimp, Fiscal Years 1956/57-1958/59

Country	1958/59	1957/58	1956/57
United States ^{2/}	386	267	232
New Guinea	35	23	34
Other	6	7	22
Total	427	297	308

^{1/} Mostly king and banana shrimp.
^{2/} Includes Hawaii.

Summary: In view of the slow rate of expansion of the Australian shrimp fishery, it appears unlikely that shrimp exports to the United States will exceed the present level for some time in the future. (U. S. Embassy in Canberra, report dated December 11, 1959.)

* * * * *

TUNA FISHERY HAS GOOD SEASON:

To December 10, 1959, one Australian firm with canneries had received about 1,600 metric tons of tuna. The catch for the season came in bursts and the firm used more tuna in a shorter time than ever before. The new clipper *Estelle Star* was believed to be the top boat. Tuna were apparently moving south, being taken off Cape Howe. Some yellowfin showed up in the Eden area--300 boxes taken in Lakes Entrance area, were about 15-lb. fish.

The tuna clippers *Fairtuna* and *Tacomoma* returned to South Australia, reportedly with 20 tons of tuna. Some more of their tuna was held by another Australian firm (Sydney) which said they would merchandise it. An Australian firm was paying 5d, a pound (\$93 short ton) for tuna 15-80 pounds and 4d, a pound (\$75 ton) for other sizes for landings at Pt. Lincoln or Adelaide. (*Australia Fisheries Newsletter*, January 1960.)

**Brazil**NEW SHORE-BASED WHALING STATION ESTABLISHED:

A new Brazilian land-based whaling station is being installed in the northern part of the State of Rio de Janeiro, about 500 miles north of the whaling station at Imituba, in the State of Santa Catarina. The station will operate from May to November, or during the same periods as

other Brazilian land-based whaling stations. According to information received from the International Whaling Commission in London, the estimated production of the new station will be 390 blue-whale units, derived from minke and sperm whales.

**British Guiana**EXPANSION OF SHRIMP FISHERY CAUSES CONCERN:

During the latter part of 1959 an increasing amount of attention was given by United States and Venezuela shrimp fishermen to the establishment of operations in British Guiana.

At the present time there is a corporation in British Guiana that operates two vessels, and in addition accepts the catches of approximately 27 additional vessels (principally from Florida and Texas) fishing off British Guiana.

During the past 10 months this corporation has forwarded to the United States market 1.1 million pounds of frozen shrimp valued at about US\$500,000.

There are strong indications that a number of additional trawlers that have operated out of Venezuela are now seriously interested in moving to new grounds because of various difficulties with the Venezuelan Government and merchants regarding their operations.

There are applications for permission to fish out of British Guiana originating from this Venezuelan group for about 12 additional trawlers, and it also appears that more trawlers are gradually coming in from Florida, probably about 20 vessels.

The Department of Fisheries of British Guiana is extremely concerned that this influx of vessels could well cause a serious situation because of the large number of very young fish caught during shrimp fishing and because the fish are discarded thereby creating a serious waste of potential fish in British Guiana waters. Special concern is also caused by the shrimp vessels catching a large quantity of young red snappers which

British Guiana (Contd.):

are an important source of food and income to that country.

Fishing vessels operating out of British Guiana come under local regulations which require owners or masters to accept Government personnel to accompany vessels on voyages whereby technicians can observe at first hand methods and operations, and more particularly evaluate the proportion of fish being discarded from shrimp catches. (United States Embassy in Georgetown, February 2, 1960.)



British North Borneo

TUNA FISHING COMPANY ESTABLISHED BY JAPANESE:

A Japanese company has decided to establish a joint tuna fishing company in British North Borneo with its base on a small island 60 miles east of Tawau. In February 1960 the Japanese company's freezer ship *Guiyo Maru* (3,800 tons) was expected to sail for Borneo. In the beginning, five skipjack boats will be used to catch an estimated 8,000 tons a year. The cannery, which will be set-up in conjunction with the fishing operation, is expected to pack 100,000 cases the first year. The capital of the new company will be some \$638,889. (*Fisheries Economic News*, January 30, 1960.)



Cameroun^{1/}

NEW NATION HAS PROMISING FISHERIES RESOURCES:

The fishing industry has just recently begun to be exploited in Cameroun. In spite of a relatively limited coast line (about 186 miles), Cameroun's maritime fishing industry looks quite promising, for the country is well endowed with numerous salt-water lagoons and the

^{1/}Became an independent state January 1, 1960, and is located in the Gulf of Guinea. Formerly was part of French Equatorial Africa and a United Nations Trusteeship under French rule.

huge estuary of the Wouri River at Douala. By the end of November 1959 exports had already amounted to 422 tons.

Fishing in Cameroun is practiced by about 1,500 natives composing two distinct groups, those who work for European-owned fishing companies and independent fishermen. The former fish by trawling, mostly for a type of sea perch called "Otolithes." Other fish caught in Cameroun waters are sole, catfish, dolphin, shark, ray, gurnard, hogfish, mullet, conger eel, spiny lobster, shrimp, crab, tuna, barracuda, seapike, and carp. The independent fishermen use pirogues and fish with hand lines and cast net.

More fish is being eaten locally in the south of Cameroun each year, which is usually dried and smoked before being marketed. The fresh fish market is primarily controlled by the European-owned companies.

It is believed that as Cameroun turns more and more to its own resources, now that it is independent, one of the industries which will expand is the fishing industry. (United States Embassy in Yaounde, February 15, 1960.)



Canada

BRITISH COLUMBIA FISH MEAL PLANTS CLOSED DUE TO POOR MARKET:

In mid-December 1959, the independently-operated fish meal and oil plants in British Columbia announced that they would not reopen their plants following the Christmas holidays due to the depressed world market for fish meal and oil. As of the end of January this year, the reduction plants remained closed with the exception of one fishermen's cooperative in Prince Rupert.

The usual spring opening of the 1959 herring fishing season in British Columbia was delayed until early October due to a dispute between the plant operators and the fishermen's union over the ex-vessel price for herring to be used for reduction. The fishermen's union had demanded a 14.6-percent increase over the 1958 price of \$13 a ton. The fish meal and oil plants rejected this offer and the union finally accepted a two-year contract at the 1958 ex-vessel price. Herring fishing began on October 6, 1959. In spite of the short fishing season, landings of herring through December 19, 1959, amounted to 166,251 tons as compared with 174,576 tons landed during the normal-length season of 1958 up to that same date.

Spokesmen for the British Columbia herring reduction industry in replying to protests by the fishermen's union point out that when the original contract was signed (probably 1958 or earlier), herring meal was selling at about \$162 a

Canada (Contd.):

ton and that when the shutdown was announced in mid-December 1959, prices had dropped to about \$115 a ton. During that period world oil prices also declined. The spokesmen attributed the drop in prices for fish meal and oil to the sharp increase in fish meal production by Peru, the bumper crop of fish meal and oil produced in South and West Africa, plus increased use of vegetable oils. The British Columbia producers claim that they cannot compete with the low-priced fish meal from Peru (about \$110 a ton f.o.b. U.S. port in January 1960). In rebuttal to statements by the fish meal and oil plant spokesmen, the union has accused the companies of "inefficient production methods" and also the Canadian Government of failure to broaden the market for herring. The company spokesmen claim that high production and labor costs prohibit British Columbia from producing canned, pickled, and smoked herring products.

The British Columbia fishermen were reported to be looking for aid from the Provincial and Federal Governments to pressure the plant operators to resume production as well as to consider granting a subsidy to permit economic operation.

In the 1959 season through December 19, British Columbia plants produced 30,031 tons of fish meal and 4,328,220 Imperial gallons of fish oil as compared to 31,337 tons of fish meal and 3,955,508 gallons of fish oil through the same date in 1958. (United States Consul in Vancouver, January 22, 1960.)

BRITISH COLUMBIA SHUCKED OYSTER PRODUCTION HIGHER IN 1959:

The British Columbia shucked oyster production in 1959 amounted to 74,632 Imperial gallons (89,558 U. S. gallons), higher by 18.8 percent than the 1958 production of 62,834 gallons. Prices to producers in December 1959 were as follows for Imperial measures: half-pints, C\$0.33-0.40; pints, \$0.65-0.80; quarts, \$1.00-1.65; gallons, \$4.00-5.25.

Table 1 - British Columbia's Oyster Meats Production, 1958-59

Year	Imperial Measures					Total Gallons
	Half-Pints	Pints	Quarts	Gallons	Other	
1959	390,837	13,158	24,849	38,845	3,503	74,632
1958	313,889	21,414	18,492	32,675	3,241	62,834

Note: Imperial gallon = 1,2003 U. S. gallons.

Retail prices in Vancouver on January 15, 1960, were C\$0.52-0.55 for an Imperial half-pint container.

Note: Also see Commercial Fisheries Review, March 1959, p. 61.



Chile

"LANGOSTINO" INDUSTRY:

The most important shellfish landed in Chile is the "langostino," or salt-water crawfish (*Galathea monodon*). This shellfish is not closely related to either the shrimp or spiny lobster, but is considered by the United States fishery trade to be a "spiny lobster-type meat" and is classified as such in U. S. Customs records.

The "langostinos" are caught in depths ranging from 50 to 100 fathoms, and the fishing season is from May to December. Landings of about 12.6 million pounds in 1956 increased to 25.1 million pounds in 1957, and to 28.3 million pounds in 1958.

The fishermen receive 65 U. S. cents a case of 13 kilos, or about 2.27 U. S. cents a pound for the whole "langostinos." Observers state that the recovery from whole "langostinos" in terms of the cooked, peeled, and deveined tail portion exported to the United States is only about 15 percent.

Exports to the United States of the cooked, peeled, and deveined "langostino tails" began in 1955 (about 5,000 pounds) and climbed to 441,423 pounds in 1956, and were almost 1 million pounds in both 1957 and 1958, according to U. S. Customs records.

SHRIMP INDUSTRY:

Most of Chile's shrimp catch is made in cold deep water (100 fathoms or more) and are sold in Chile as "camarones." The shrimp run about 120 to the pound heads off and are caught usually from May to December. According to estimates, the landings in 1959 amounted to about 750,000 pounds, or about 11 percent lower than the 842,000 pounds reported for 1958. Landings both in 1958 and 1959 were about three times the landings made in 1956 and 1957.

As of December 1959, 15 vessels were reported to be engaged in the shrimp fishery. These shrimp fishing vessels, of 20-50 metric tons hold capacity, range in size from 44 to 80 feet in length and are powered by 100 to 300 German-made Diesel engines.

Chile (Contd.):

Shrimp processing plants purchase heads-on shrimp from the vessels at \$1.10 per case of 15 kilos (about 3.33 U. S. cents a pound). Based on a headless shrimp cost of about 10 U. S. cents a pound, other costs of deveining, cooking, freezing, packaging, and transportation bring production costs up to about 42 U. S. cents a pound.

Exports from 1956-59 were all to the United States and amounted to 163,636 pounds in 1958, 45,340 pounds in 1957, and 84,027 pounds in 1956, according to U. S. Customs records.

The 1959 budget of the Corporacion de Fomento de la Produccion (Government Development Corporation) included US\$500,000 for use in facilitating the purchase of fishing boats. In October 1959, the Government announced that the Ministry of Agriculture would import motors and fishing equipment to be sold on credit to fisheries cooperatives in the Provinces of Tarapaca and Antofagasta. The Government hopes to extend credit to other fisheries districts in the future. A United States citizen proposes to establish a shipyard at Iquique for building fishing vessels of native wood. The proposed vessels will be combination trawler-purse seiners about 66 feet in length with a hold capacity of 100 tons.

There are no taxes on shrimp exports, but the processing companies are taxed. A letter of credit is required to obtain an export license. Inspections for quality are made at the plant and the point of shipment. (United States Embassy in Santiago, December 17, 1959.)



Cuba

GOVERNMENT ASSUMES CONTROL OF FISHING COOPERATIVES:

In a brief Resolution published in the Cuban Official Gazette No. 9 of January ary 14, 1960, the INRA (National Agrarian Reform Institute) formally assumed control over all the Cuban fishing cooperatives.

This confirms previous reports that the INRA intended to enter more actively into the fisheries field. However, no official announcement has been made concerning the reported possibility that the National Fisheries Institute (Instituto Nacional de la Pesca) would be completely absorbed by the Fisheries Department of the INRA.

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RESOLUTION ESTABLISHES MAXIMUM PRICES FOR MANY FISH AND SHELLFISH:

The Cuban Ministry of Commerce Resolution No. 3, which appeared in Official Gazette No. 6 of January 11, 1960, established maximum prices to the public on a number of listed fish and shellfish products.

The National Fisheries Institute (Instituto Nacional de la Pesca) of the Cuban Maritime Development Office previously had established a new ceiling price to be paid to fishermen of US\$12 per case of 60 pounds for whole spiny lobster or for 20 pounds of spiny lobster tails, which was to become effective retroactively to June 15, 1959. This decision, published in Official Gazette No. 207 of November 2, 1959, is being hotly contested by the spiny lobster packing plant owners who may be obliged thereby to pay the difference between the new price of \$12 per case and the formerly-agreed price of \$11.50 per case, retroactively to June 15, 1959.

The stated purpose of these pricing regulations are said to be to improve the economic position of the Cuban fishermen as a class. The regulations militate quite definitely against the packing plant owners. The Cuban Government claims that the consuming public will also benefit from these pricing measures.

Recently the INRA (National Agrarian Reform Institute) was reported to have expropriated approximately 300 fishing vessels in Las Villas Province. The INRA is proceeding to establish fishermen's cooperatives and is operating ice plants and "peoples stores" in that area. The INRA is also reported to have intervened several packing firms in Manzanillo, Oriente, which will henceforth be op-

Cuba (Contd.):

erated as cooperatives. A boatyard in Manzanillo is also reported to have launched the first fishing boat constructed for the INRA.

The INRA apparently has not yet felt it expedient to attempt to expropriate fishing concerns in the Habana area where it might be expected that the INRA would encounter considerable resistance, especially on the part of the Habana fishing fleet skippers who display no intentions of willingness to turn over their privately-owned boats to any cooperative fishing organizations. INRA has reportedly paid in cash for all the fishing facilities it has thus far expropriated, the United States Embassy in Habana reported on January 18, 1960.

Note: See Commercial Fisheries Review, December 1959, p. 76.



Denmark

EXPERIMENTS ON FRESH FISH SHIPMENTS PLANNED:

Two fish exporters located in Esbjerg, Denmark, have been selected by the Danish Ministry of Fisheries to carry out experimental shipments of various kinds of fresh fish to France and Italy. The project is being financed by a grant of 25,000 kroner (US\$3,621), and will be supervised by experts from the Ministry's research laboratory.

The project is comprehensive, and will include tests of various packing materials, insulation materials, and market researches of the demand for the fresh fish in the area to which they are shipped. The shipments will take place over a period of several months so that the effect of air temperature on the fish can also be taken into account. The first shipment is scheduled to go to Boulogne, France, states a United States Embassy dispatch from Copenhagen dated January 29, 1960.



Egypt

EQUIPMENT FOR NEW SARDINE CANNING PLANT RECEIVED:

According to press reports from Egypt, the Japanese equipment for the sardine canning plant to be set up at Damietta arrived early in February at Port Said. The reports state that the cost of setting up the new canning plant will be about 100,000 Egyptian pounds (about US\$284,000 at official exchange rate) and that the plant will be in operation in September 1960. The canned sardines produced by the plant are destined for export, the United States Consul at Port Said reported on February 2, 1960.



French West Africa

TUNA FISHERY TRENDS, DECEMBER 1959:

The 1959/60 tuna fishing season off French West Africa began on November 1, 1959, one month earlier than in 1958. This will be the fifth tuna fishing season in that area and landings are expected to be up sharply from the 1958/59 season.

A Senegalese delegation, headed by the Director of Cabinet of the Minister of Rural Economy, participated on September 30, 1959, in the Paris meeting of the Tuna-Fish Interprofessional Committee. It submitted the 1959/60 season's program which involves a catch of 16,000 metric tons of tuna (about 7,000 tons landed in 1958/59 season) and which was agreed to according to official sources. Of that quantity, 7,500 tons are to be processed in the 5 local canneries (against 4,500 tons in 1958/59), 2,500 will be frozen in the Dakar area and shipped to French mainland canneries, and 6,000 tons are due to be frozen in Dakar for sale in foreign markets. In connection with the latter, the Minister of Rural Economy mentioned in a press interview late in November that a United States tuna canning firm had made "extremely interested proposals regarding the United States market. . .with a possibility of offering an outlet for as much as 10,000 tons annually." He also referred to a contract for the supply of 3,000 tons of tuna which had been placed

French West Africa (Contd.):

by Italy, which groups the tuna clippers of France and Senegal.

The possibility of substantially expanding the tuna canning facilities in the Dakar area has been under consideration. A mission of three top executives, two representing France's fishing interests and the third the Caisse Centrale de Credits Cooperatifs pour la Pêche, came to Dakar in October to study the possibility of establishing a tuna cannery with a capacity of 1,000 metric tons a month. If this project materializes, Dakar would have the largest such factory in French West Africa and, reportedly, of all the European Economic Community (EEC) countries.

The 1959/60 16,000-ton tuna catch quota reportedly represents half of the expected total for the area. The Senegalese Government is most anxious to develop the tuna resources, the United States Consul at Dakar reported on December 17, 1959.



German Federal Republic

FOUR STERN-FISHING TRAWLERS ORDERED BY FISHING COMPANY:

West Germany's largest ocean fishing company has contracted with Bremerhaven shipyards for seven Diesel-powered trawlers. Four of the new vessels will be of the stern-fishing type. Two of the stern-fishing trawlers will be about 219.8 feet in length with a 36.1-foot beam. Both of these vessels will be equipped for freezing fish and for fish meal production.

The other two stern-fishing trawlers, reportedly, will differ significantly in construction and method of operation from the usual type of stern-fishing trawler. The other three conventional trawlers will be built for the herring fishery. All seven vessels will be placed in service in 1960 and 1961. (Fiskets Gang, January 14, 1960, Norwegian trade paper.)



Greece

AGREEMENT REACHED WITH PORTUGAL FOR CONSTRUCTION OF TWO FACTORYSHIPS:

The Greek Government announced late in 1959 that an agreement had been reached with Portugal for the construction of two factoryships. The vessels will be 84 meters (about 256 feet in length) and will be paid for from the proceeds of 5,200 metric tons of Greek tobacco sold to Portugal. The vessels are to be sold to two Greek fishing companies on very liberal terms. The value of each factoryship is estimated to be about US\$1,850,000. The contract with the Greek fishing companies calls for repayment of the loans in eight annual installments.

The contract terms, which call for very little actual capital outlay on the part of two Greek fishing companies who will operate the vessels, has been the cause of some criticism on the part of the Greek fishing industry. (Aleia, December 17, 1959.)

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FROZEN FISH PRODUCTION AND IMPORTS INCREASE:

The four Greek fishing vessels that fished off the Northwest African Coast (Mauritania) during 1959 landed 3,900 metric tons of frozen fish. In addition, frozen fish imports of 2,269 tons (valued at US\$645,000) from January-June 1959 were up by 449 tons from the 1,820 tons (valued at US\$468,000) imported in 1958. For the whole of 1959, it is estimated that frozen fish imports will total 5,000 tons, valued at US\$1,500,000.

In 1960 it is estimated that 10 vessels under construction in foreign shipyards will be added to the fleet. With these additions to the fleet of vessels equipped for freezing fish at sea, landings of frozen fish in 1960 are expected to be about 12,000 tons and by 1961 should reach 18,000 tons.

Some Greek fishing firms find the expansion of the landings and imports of frozen fish a cause of worry. These firms have requested the Government to postpone new ship building and curtail imports, the Greek fishing periodical, *Aleia* reported in the December 1959 issue.



Haiti

NEW TAX ON IMPORTED FISHERY PRODUCTS:

A new Haitian tax of 5 percent on the c.i.f. value of imported luxury foodstuffs, including practically all fishery products except fresh and salt fish, became effective on January 27, 1960. The fishery products subject to the new tax are as follows: Tariff Item No. 12433: salmon, simply prepared and preserved in cans; No. 12434: cod fish, herring, aiglefin (haddock), mackerel, tuna with or without sauce or oil, and salmon packed in sauce or oil; 12434A: kippered herring (smoked herring in boxes without oil added); No. 12435: sardines and similar fish, with or without oil; No. 12436: anchovies and anchovy paste; No. 12437: caviar, fish eggs, and fish paste; No. 12438: oysters and shrimp in cans; No. 12439: other fish, scallops, and seafood products, preserved.

Most luxury-type foods imported into Haiti are also subject to a general luxury tax of 4-6 percent, depending on the product. Information on the fishery products against which this tax is levied is not available. (United States Embassy at Port-Au-Prince, February 9, 1960.)



Honduras

SHRIMP INDUSTRY:

Production: Prior to 1958 shrimp landings in Honduras amounted to about 50,000 pounds. In 1958, Honduras, along with other Central American countries, experienced a mild boom and landings in that year were probably close to 900,000 pounds. However, in 1959 the trend was reversed due to (1) unfavorable legislation which curtailed the operations of foreign vessels (mostly United States) and (2) the drop in United States shrimp prices. Maximum potential is between 1-3 million pounds of headless shrimp a year, half white and half pink.

The size of the shrimp is reported to average about 26-30 count per pound (headless), and very few under 15-count shrimp are caught. Two species dominate the catches--white shrimp (*Penaeus schmitti*) and pink shrimp (*Penaeus duorarum*).

Fishing Fleet: As of mid-October 1959, there were only eight active shrimp trawlers fishing for shrimp in Honduras. A freezer ship, which had been operating with a fleet of five trawlers, grounded and sank, and several trawlers were laid up for repairs. All of the vessels are powered with Diesel engines and range in length from 30 to 70 feet. No shrimp fishing vessels are being built in Honduras. Further additions to the fleet at the present time are doubtful due to restrictive laws, and the high cost of production.

Costs of Production: For independent vessels, costs (based on 1958 figures) of producing shrimp for export are estimated to be about 51.5 U. S. cents. These costs are as follows: ex-vessel price, 32.5 cents; freezing and grading, 7.0 cents; cases and cartons, 3.0 cents; unloading or permit charges, 5.0 cents; and export taxes, 4.0 cents. In addition, cost of ocean freight to the United States is about 3.5 cents a pound, and other costs incurred to the point of distribution in the United States includes unloading, storage, and commission. These costs help to explain the sharp drop in exports in 1959.

Shore Facilities For Processing Shrimp: There are two freezers located in Honduras. One plant is located on the Island of Guanaja and the second on Caratasca Lagoon. Another freezing facility was the freezer ship which was lost by sinking. Ice costs about \$12.50 a ton and Diesel fuel 20 U. S. cents a gallon.

Exports and Taxes: No reliable figures on shrimp exports are available from Honduras. According to United States Customs figures, imports of shrimp from Honduras jumped from none in 1957 to about 836,000 pounds in 1958, and then declined to 271,000 pounds in 1959.

Prior to September 1959 export taxes amounted to 10 percent on a valuation of 1.5 lempiras a pound (about 75 U. S. cents) plus an additional tax of 10 centavos a 100 kilos. Currently export taxes amount to 10 percent on an export price of 80 centavos (40 U. S. cents a pound) plus the 10 centavos a 100 kilos mentioned above. This amounts to slightly over 4 U. S. cents a pound, the United States Embassy at Mexico reported on December 14, 1959.



Iceland

CONVENTION PROPOSES INCLUSION OF COASTAL SHELF IN TERRITORIAL FISHING LIMITS:

A national Fisheries Convention was held in Reykjavik, Iceland, the week of February 7, 1960, with delegates representing the seamen, fishing boat owners, and fish processors. This convention issued a resolution to the effect that Iceland's "entire coastal shelf shall be within the fishing jurisdiction limits" and it is Iceland's "duty and right to decide conservation measures for the fish stocks on the coastal shelf. . . ."

In the opening speech it was mentioned that the catch per fisherman has increased 20 times since 1905. In 1959 the fish catch per working fisherman came to 100 metric tons. (United States Embassy at Reykjavik, February 19, 1960.)

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FISHERIES TRENDS, JANUARY 1960:

On January 14, 1960, the Icelandic Federation of Labor announced that the negotiations committee for the Seamen's Union had recommended to the participating unions that wages and terms for

Iceland (Contd.):

fishermen on the motorboat fleet temporarily remain the same as those for 1959.

At a meeting of the Reykjavik Municipal Fisheries Board on January 4 it was announced that the Municipal Fish Packing Center would join the Freezing Plants Corporation for frozen fish export purposes.

Since the Municipality purchased the fish packing center from the State last summer it has almost doubled the center's capacity. It continued to use the same agents abroad for selling its frozen fish products.

The decision to join the Freezing Plants Corporation increases the latter's share of the frozen fish export market from about 81-85 percent. The remainder is sold by the Federation of Iceland Cooperative Societies.

With the opening of the winter cod season, Icelandic trawler owners are faced with a severe shortage of fishermen. This shortage is primarily due to the Faroese Fishermen's Union refusing to permit their members to work on Icelandic vessels until assurances were obtained that they would not suffer as a result of the rumored currency devaluation and would not have to pay Icelandic taxes. However on January 21 a telegram was received from this Union that three representatives would arrive in Reykjavik on January 26 to talk terms with the Union of Iceland Fishing Vessels Owners. The importance of the Faroese for manning the Icelandic fishing fleet is seen from the fact that last year 880 foreign seamen, mostly Faroese, out of 6,000 crew members manned vessels of the fishing fleet. (United States Embassy at Reykjavik, January 25, 1960.)

FISHERY LANDINGS IN 1959 BREAK RECORD:

Preliminary estimates on the landings of fishery products in Iceland of 623,000 metric tons make 1959 the best year in history. This amount exceeds

the very good landings made in 1958 by 42,000 tons. The record landings made in 1959 were due primarily to the good herring catch, which exceeded the 1958 landings of that species by 76,000 tons.

Although the over-all 1959 herring fishery was excellent, the South Coast season which ended on January 12, 1960, was disappointing in the landings of large herring suitable for salting. In 1958, the South Coast fishery yielded 107,000 barrels of salted herring as compared with 51,488 barrels during the 1959 season. The 1959 production of salt herring was not sufficient to meet the commitments on advance contracts of 58,000 barrels. (United States Embassy at Reykjavik, January 25, 1960.)

VESSEL OWNERS FAIL TO REACH AGREEMENT WITH FAROEOSE FISHERMEN:

Negotiations have been broken off between the Federation of Icelandic Fisheries Owners and the Chairman of the Faroese Seamen's Union, regarding terms of employment for about 800 Faroese fishermen who would serve on Icelandic fishing vessels between February and May or June of this year.

Although there were differences over a number of issues, the chief issue maintained by both the Icelandic vessel owners and the Iceland Seamen's Union is that Faroese seamen must not receive better wages than those paid to Icelandic fishermen. The Faroese Union demanded that Faroese fishermen receive 1,500 Danish kroner a month (about US\$217) as minimum wages. Last year Faroese fishermen were authorized to send home approximately 1,060 Danish kroner a month (US\$154).

On February 5 it was announced that the Faroese Fishermen's Union intended to sue the Union of Icelandic Fishing Vessel Owners for pay still due certain Faroese fishermen. The Icelandic vessel owners' group replied that it was surprised at this move since it would not be held financially responsible for the unfortunate failure of a few vessel owners to properly pay wages.

The impasse in negotiations face Faroese with unemployment and a number

Iceland (Contd.):

of Icelandic trawler owners with shortages of fishermen. On February 2, a leading fish producer in Iceland suggested compulsory service as a solution for the fishing fleet's manpower problem. (United States Embassy at Reykjavik, February 8, 1960.)

**Iran****SHRIMP INDUSTRY TRENDS, DECEMBER 1959:**

As of late 1959 there was only one shrimp fishing company active in the Iranian shrimp fishery. This firm, which is controlled by a New York City importing firm, is reported to have nine Diesel-powered shrimp trawlers. These vessels are 65 feet long with a displacement of about 50 tons. The 1,000-ton freezership, which was due to arrive in Iran about September 1959, broke down in the Mediterranean and until ready to begin operations in the Persian Gulf, shrimp fishing has been limited to two vessels. A second Iranian fishing company, formerly engaged in fishing for shrimp and other fish, no longer lands shrimp.

No official statistics on the shrimp landings are maintained, but some data on exports are available. According to the customs data, exports of shellfish in 1958 were made to Italy (117 metric tons, valued at US\$94,000), to the United States (82 tons, valued at \$92,000), and to Oman (17 tons, valued at \$4,000). According to United States Customs records, exports to the United States in 1959 increased sharply to 740,000 pounds.

**Ireland****CUSTOMS DUTY ON MARINE OILS INCREASED:**

Effective December 11, 1959, Ireland's Department of Industry and Commerce increased the customs duties on refined vegetable, fish, and marine ani-

mal fats and oils 50 percent (full) and 33½ percent (preferential--United Kingdom and Canada) ad valorem. The previous rate was a flat 33½ percent ad valorem. (United States Embassy reported from Dublin, January 13, 1960.)

**Italy****FISH FREEZING AND STORAGE FACILITIES:**

The refrigeration of Italian fishery products is carried out in ice-refrigerated spaces with a capacity of 25,000 cubic meters. Fast-freezing is carried out on six ships provided with freezing equipment and in six shore-freezing plants. The storage capacity of cold-storage warehouses operated in port areas is large enough to allow the storing of frozen imported fish.

During transportation, refrigerated products are usually kept at temperatures ranging from 2° C. to 3° C. (35.6° to 46.4° F.), while frozen products, either slowly or rapidly frozen, are kept at temperatures ranging from -10° C. to -7° C. (14° to 19.4° F.). Deep-frozen products are usually kept at -20° C. to -18° C. (-4° to -0.4° F.). (United States Embassy in Rome, January 12, 1960.)

**Japan****WINTER ALBACORE FISHERY TRENDS, JANUARY 1960:**

Since the beginning of the year, there have been signs that the beginning of winter albacore fishing was close at hand. Small quantities of hook-and-line fish, some 1,000 metric tons in all, were landed in January at Ishinomaki, Onagawa, Nakaminato, Yaizu, and Shimizu. In addition, some 500 tons of long-line albacore were landed at Katsuura, in the central part of Honshu, and Shimizu.

The hook-and-line fishing in January was in the vicinity of 144° E. longitude and 36°30' N. latitude, where about 50 vessels were said to be operating. The

Japan (Contd.):

long-line fishing was around 152° E. longitude and 30° N. latitude. Hook-and-line albacore weigh 37-40 pounds each on the average and almost all of them are being bought for canning purposes. Long-line albacore are divided about equally between the cannery and freezers. (Suisan Tsushin, January 20, 1960.)

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PORT OF SHIMIZU BOOMING WITH WINTER ALBACORE AND INDIAN OCEAN TUNA:

Since mid-February landings of winter albacore at the port of Shimizu have been good and from 2,000-3,000 large albacore (between 24-33 pounds each) were landed every day and were bought by the cannery. These winter albacore were landed by about 35 boats from Kushikino, Kagoshima Prefecture, which reported good fishing and are now based at Shimizu. These fish from nearby waters were sold at the high price which has prevailed since the end of 1959. At the same time, tuna boats were coming in from the Indian Ocean one after another. According to their reports, this year three times as many boats are fishing in that area, but catches appear to be good.

The port of Shimizu also received landings every day of Indian Ocean bluefin. In December 1959 there were landings of 131 tons of Indian Ocean bluefin and albacore by four boats from Mie and Kagoshima Prefectures, and the bluefin sold for 533 to 3,850 yen per 10 kg. (US\$148-1,069 a metric ton), the southern albacore at 850-950 yen (\$236-264 a ton), and local albacore at 910-1,050 yen (\$253-292 a ton).

The Japanese vessel No. 2 Wako Maru (260 tons gross), which is famous for big landings of Indian Ocean tuna, sailed December 26, fished for 9 days, from January 13 to 21, caught 116 to 342 Indian Ocean bluefin each day, and made a quick trip back with 80 metric tons of tuna.

The fishing took place at 23°-26° S., 101°-107° E. in surface water temperatures of 21°-22° C. (69.8°-71.6° F.).

Although there are three times as many boats fishing in that area as last year, catches are good, with all boats taking 4 to 10 tons a day. It is anticipated therefore that landings of Indian bluefin will continue at a good level for some time. (Nippon Suisan Shimbun, February 17, 1960.)

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ATLANTIC ALBACORE SEASON ENDS WITH ONLY 5,000 TONS:

Fishing conditions early this year in the Atlantic tuna fisheries as operated by about 35 Japanese long-line vessels are described in the Japanese periodical Suisan Tsushin. The reported decline in the hooked rate had occurred, it seems, particularly in the fishing of Atlantic albacore.

Albacore fishing off Brazil had shown a sharply increased catch for some time since the end of November 1959 and a forecast was made in December that 15,000 tons would be caught by the end of the season early this year. But by January 27, 1960, only 5,000 tons or so had been caught and the end of the albacore season came earlier than expected.

In place of albacore, yellowfin fishing off the Gold Coast of Africa has developed. A good fishing pace was reported--12 to 20 tons a day per vessel--with a rate-of-catch equal to that of two years ago. The yellowfin being caught in the area are smaller than the type suitable for export to the United States, but most of the fishing vessels have sales contracts with such European countries as Italy and Yugoslavia.

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REGULATIONS FOR TRANSSHIPMENT OF FROZEN YELLOWFIN TUNA EXPORTS TO UNITED STATES IN 1960:

The shipboard freezers' section of the yellowfin tuna committee of the Japanese Export Tuna Freezers' Association met on February 22 to work out a final plan for regulating transshipment exports of frozen yellowfin tuna (mostly from the Atlantic) to the United States during the 1960 export year. In form the regulations will not be greatly different from last year's, but in substance there will

Japan (Contd.):

be a considerable revision. The main points are as follows:

1. It is likely that the restriction of 2 trips per year per vessel will be removed. If this materializes, it is possible that medium-sized tuna vessels will begin regular operations out of the base at Freetown in Sierra Leone, West Africa. This will mean a change of the Atlantic tuna fishery from a simple distant-water operation to a foreign-based type of fishery.

2. Hitherto the regulation of transshipments of tuna to the United States was aimed only at Atlantic operations, but beginning with the new export year, Indian Ocean and Pacific Ocean operations will also come under regulation. This means, in actuality, the recognition of transshipment exports from the Indian Ocean, and brings up the possibility of a broad change in the pattern of operations in the Indian Ocean. However, transshipments from the Pacific will probably be prevented by the new system of designating transshipment ports.

3. It is not yet finally settled, but plans are under examination for revising the method of calculating the annual limit on total number of trips for transshipment (100 to 120 trips), so that trips on which the vessel is not loaded to capacity, or trips by medium-sized vessels, will not be counted simply as one trip but will be prorated; for example, as one-half a trip. (Suisan Tsushin, February 22, 1960.)

EXPORT QUOTA TO U. S. FOR FROZEN TUNA LOINS AND ALBACORE DISCUSSED:

The Japan Frozen Foods Exporters Association tentatively decided early in February that for 1960 the export quota to the United States directly from Japan for frozen tuna loins will be 4,000 short tons, and frozen albacore tuna 30,000 tons.

The 1959 quotas were 3,000 tons for loins and 30,000 tons for albacore. (Suisan Tsushin, February 4, 1960.)

CANNED TUNA IN OIL EXPORTS DOUBLE:

Japanese exports of tuna canned in oil from April to December 1959 amounted to 1,136,000 actual cases, or nearly double the 599,000 cases exported during the same period of the preceding year, according to a compilation by the Export Tuna Cannery Association. Of this total, white meat accounted for 156,000 cases (115,000 the year before) and light meat for 980,000 cases (484,000 cases the preceding year).

Exports in actual cases from April-December 1959 went to (1958 figures in parentheses): Germany 344,772 (188,828), Canada 103,864 (86,852), United Kingdom 102,457 (40,791), Saudi Arabia 88,428 (44,907), Belgium 79,325 (49,289), Lebanon 78,608 (22,105), Netherlands 68,998 (47,913), Syria 66,130 (1,179); Total (omitting smaller markets)--1,136,863 cases (599,886).

Total exports for the calendar year 1959 were 1,346,792 cases. Very little tuna canned in oil is exported to the United States. (Suisan Tsushin, February 20, 1960.)

PRICE CUT FOR CANNED LIGHT MEAT TUNA IN BRINE DISCUSSED:

The Japanese Tuna Cannery Association early in February held its directors' meeting and discussed a price cut for canned light meat tuna in brine for export to the United States. The exporters' side of the Association asked for a price cut because of weak market conditions. It was decided to leave the matter to the discretion of the president of the packers association and the president of the sales company.

The general opinion was that a cut of 30¢ a case on light meat, on the basis of the present price of \$7.30 f.o.b., may be sufficient, but the president of the sales company stated that he thought a 50¢ reduction was necessary. If the cut of 50¢ a case is accepted, the new price on light meat will be \$6.80 a case f.o.b. Also, the sales company reported that it expected to put up 200,000 cases of light meat on the first sale in February. (Fisheries Economic News, February 4, 1960.)

Japan (Contd.):

METHOD OF DETERMINING FRESHNESS OF TUNA DEVELOPED:

Studies of the deoxidizing enzymes in fish have produced a new method of determining the freshness of tuna. These studies have revealed for the first time the reason for the existence of the dark lateral muscle tissue in such migratory fish as tuna.

The migratory fish are much more active than the sedentary fish, and in them the dark lateral muscle tissue performs the same functions as the liver in compensating for this additional activity. When the fish dies, the action of the enzymes decreases. From the degree of this decrease the amount of time the fish has been dead can be determined and this can be used in measuring the freshness of the fish.

It is reported that measurements by this method can be made in about five minutes, and it is expected that it will be used in the future for determining the freshness of frozen tuna for export.

Assistant Professor Fukuda of the Fisheries Department of Miyazaki University has received a doctor's degree for his studies which led to this method of determining the freshness of tuna. (Suisan Tsushin, February 20, 1960.)

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TUNA RESEARCH CONFERENCE:

The 1960 Tuna Research Conference, sponsored by the Nankai Regional Fisheries Laboratory of the Japanese Fisheries Agency, was held from February 2-4, 1960, at Kochi. About 60 tuna research biologists from universities and laboratories all over the country were in attendance. The purpose of the conference was an exchange of data on the tuna research done by the various research agencies during 1959, in order to establish a basis for future development of the fisheries. (Nippon Suisan Shimbum, February 5, 1960.)

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NO CALIFORNIA OFFICE TO BE SET UP BY JAPANESE FROZEN TUNA JOINT SALES COMPANY:

Late in December 1959, a Japanese periodical reported that the Japanese

frozen tuna export industry was planning to set up an office in California of the Japanese Frozen Tuna Joint Sales Company. The United States legal counsel and advisor of the Japan Export Frozen Tuna Products Association and Japan Frozen Food Exporters Association reports that no office will be established in California.

The original report indicated that the Japanese frozen tuna export industry planned to establish an office of the Joint Sales Company in California, in order to improve the conditions for delivery of frozen tuna to the United States and to strengthen the Japanese inspection system. The Japanese producers had been considering the establishment of an office in California for some time, but the idea was dropped during the process of setting up the new joint sales organization.

The trading companies opposed setting up an office in California for the Joint Sales Company, as it would benefit the producers as opposed to the traders, and they argued that it would be better to utilize the existing offices of the trading companies more effectively. (Suisan Keizai, December 24, 1959.)

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FISH MEAL FACTORYSHIPS PREPARE FOR NEW BERING SEA FISHING SEASON:

The three Japanese companies that are operating fish-meal factoryships in the Bering Sea this year hastened preparations to have their vessels sail in mid-April. In particular, the company which has bought the Renshin Maru and which also has the Kinyo Maru (which operated last year) hoped to get both fleets ready to sail from Hakodate by April 10, because of demands from the Bureau of Animal Husbandry and the Federation of Purchasing Cooperatives for 5,000 metric tons of fish meal by mid-May.

Earlier, at the request of the Bureau of Animal Husbandry, the Japanese Fisheries Agency had approved the importation of 20,000 tons of fish meal annually. This was done in order to stimulate the producers of saury meal in northern Honshu and Hokkaido, who were holding their product off the market for speculative reasons. Now one of the compa-

Japan (Contd.):

nies operating fish-meal factoryships has decided to try to supply 5,000 tons of meal by mid-May (or 3,000 tons, depending on circumstances) in order to hold the imports down to as low a level as possible and at the same time to meet the request of the Federation of Purchasing Cooperatives and stimulate the saury meal producers to turn loose their stocks.

Production plans for the Kinyo Maru and Renshin Maru fleets total 26,000 tons of fish meal. Last year the Kinyo Maru sailed April 15 and spent a week in test operations after reaching the fishing grounds, so in actuality she will be about 10 days earlier in beginning operations this year. (Suisan Tsushin, February 22, 1960.)

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TRAINING SHIP TO SURVEY FISH MEAL PROSPECTS OFF CANADIAN WEST COAST:

The Japanese training ship Kano Maru (152 tons gross) of the Uetsu Prefectural Fisheries High School, Ishikawa Prefecture, has been tentatively chartered to a Japanese fishing company to act as a fish-meal survey ship off the west coast of Canada beginning in April 1960. Up to now this vessel has worked as a survey ship in the salmon fishery for the Japanese Fisheries Agency, but with a yearly charter fee of 5 million yen (US\$13,900), there has been a loss of around 640,000 yen (\$1,800), in addition to docking charges and other costs.

Under the provisional charter with the Japanese fishing company, its income will be about 9 million yen (\$25,000). The charter will be finalized after approval by the Prefectural Legislature. The committee which operates the vessel is hoping that not only will financial losses be ended, but that training of students in new fishing and processing methods will become possible under the new arrangement. (Suisan Keizai, February 25, 1960.)

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USE OF FISH-MEAL FACTORYSHIPS OFF SOUTH AMERICA AND AFRICA STUDIED:

A large Japanese company is planning to send one of its directors to Peru, Ecuador, and Angola to study possibilities of operating its fish-meal factoryships (Kinyo Maru and Renshin Maru) off those countries when they are not engaged in fish-meal operations in Japanese waters.

The company intends to participate in joint enterprises with those countries by sending the Renshin Maru to Peru and Ecuador. Those countries are asking for technical assistance in meal manufacturing. The Kinyo Maru would be sent to Angola. The factoryships would collect catches from fishing boats operating off those countries and process fish meal and oil, which would be sold to local operators. (Suisan Tsushin, January 20, 1960.)

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SALMON STUDY TEAM TO VISIT THE UNITED STATES:

According to an officer of the Japan Salmon Resources Conservation Association, plans are being made for a party of six Japanese fishery experts to visit the United States from July 27-September 25 under the auspices of the Japan Productivity Center.

The objective of the trip will be to study techniques and policies for the conservation and propagation of salmon, with emphasis on hatching and rearing, protection of the fish during their life in streams, and improvement of physical environmental conditions in fresh waters where salmon occur.

The party will be headed by the Vice-President of Japan's largest salmon fishing company and will include the former Director of the Japanese Fisheries Agency, the Vice-President of the Inland Waters Fisheries Federation, a representative of the Promotion Section of the Fisheries Agency, and one member each from the fisheries departments of Gifu and Iwate Prefectures. The itinerary and schedule are being worked out in co-

Japan (Contd.):

operation with the U. S. Fish and Wildlife Service and the U. S. Operations Mission to Japan. (United States Embassy in Tokyo, February 12, 1960.)

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SOME PROGRESS IN REDUCING SALMON FISHERY FLEET:

Because of the severe cut in Japan's high-seas salmon-catch quota that resulted from last year's Soviet-Japanese fisheries conference, and the strong possibility that the quota will be reduced even further at the current conference at Moscow, the Japanese Government has been trying since late last year to bring about a reduction in the size of the salmon fleet. Favorable fishing conditions and an increase in the price of canned salmon in 1959 made it possible for 16 motherships and 460 fishing boats to operate profitably under the reduced catch quota, but the industry has recognized that to keep this great fleet fishing would risk serious losses if fishing conditions or world market conditions should take an unfavorable turn.

The Japanese Fisheries Agency has run into strong conflicts of interest and political pressures in its task, and progress has been very slow. The large companies which operate the motherships, while recognizing the necessity of a cutback, have been unable to compromise on the proportion by which each company's fleet is to be cut. The fishing boat owners have demanded as their price for quitting the fishery the granting of tuna-fishing licenses and ample financial assistance for making the changeover from salmon to tuna fishing. This proposition has been fiercely resisted by tuna-boat owners, who want no additional competition in their business. Earlier offers by the Fisheries Agency to help the displaced salmon fishermen enter the developing Bering Sea fishmeal factoryship fleets have evidently been spurned, as the loss of an opportunity to take part in the lucrative salmon fishery could hardly be compensated by permission to engage in an untried enterprise which seems unlikely to be able to hold even its domestic market against the competition of Peruvian fish meal.

On February 18 the Japan Salmon Fishing Federation, representing the fishing boat owners' groups, finally decided to accept the Government's plan for a withdrawal of 50 boats from the fishery. The owners of these boats are to be given licenses that will enable them to fish for tuna nine months out of the year. No decision has been made as to compensation that each owner may receive, although their Federation is talking in terms of ¥4 million (US\$11,000) from the Government to assist in outfitting for tuna fishing and ¥2.5 million (US\$6,900) monetary compensation from the salmon industry. On February 20 the mothership-operating companies decided that, of the 50 boats to be retired, 19 would come from one fishing company's fleets, 16 from another fishing company and its subsidiaries, and 8 from a third company. A decision as to how many motherships each of the large companies is to retire will be postponed until later. (United States Embassy, Tokyo, February 26, 1960.)

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SQUID LANDINGS IN 1959 NEAR RECORD:

According to the Products Section of the Hokkaido Fisheries Department, Hokkaido's squid landings for 1959 reached 265,000 metric tons, the highest since 1954. Up to the end of the war the Hokkaido squid catch never exceeded 70,000-80,000 tons, but then the "squid boom" began, with catches of 135,000 tons in 1947, 208,000 tons in 1948, 232,000 tons in 1949, 290,000 tons in 1950, 310,000 tons in 1951, 264,000 tons in 1952, 234,000 tons in 1953, and 266,000 tons in 1954. From 1955 on for several years the catches dropped to about 140,000-180,000 tons, but they appear to be increasing again.

The amount of squid shipped fresh out of Hokkaido in 1959 was 19,433 tons, an increase of 4,500 tons over the preceding year.

Fresh squid consumption within Hokkaido was 12,500 tons, up 4,400 tons over 1958. Per capita consumption in Hokkaido was 2.5 kilograms (5.5 pounds); 146,861 tons were used for drying; 60,774 tons were frozen; and 24,758 tons were used for salting, smoking, canning,

Japan (Contd.):

etc., making a total of 232,394 metric tons of squid that were processed in Hokkaido. (Nippon Suisan Shimbun, February 5, 1960.)

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EXTENSION OF TERRITORIAL WATERS WOULD ADVERSELY AFFECT FISHING:

In March at Geneva a conference on the Law of the Sea will be held to decide the area of the territorial seas and to establish other rules governing relations between coastal and maritime states. The Japanese Fisheries Agency is gathering data on the effects of a 6 plus 6 plan (6 miles for territorial waters and an additional 6 miles for fishery jurisdiction) as well as the criteria that would be used if rights established within the past 5 years in the zone of exclusive fisheries jurisdiction were recognized, according to a news release in the Japanese periodical Suisan Keizai, February 21, 1960.

In view of the various responsible sections of the Fisheries Agency, if the conference should settle on the total 12 miles of territorial waters and fisheries zone of the United States proposal: (1) the Japanese catch of whales in the Aleutian area would be decreased by 80-90 percent for sperm whales and by 20-30 percent for baleen whales (compared with past production); (2) the catch of sedentary or shoal skipjack around islands of the tropical Pacific would be reduced by about 30 percent; (3) even though the Rhee Line were to be erased, if in turn a zone of exclusive fishing rights were established around Saishu Island 12 miles offshore, it would have a serious effect on the mackerel fishery; (4) it would also be disadvantageous for the fishery off the Chinese coast in the South China Sea; (5) the fishing grounds of the trawl fishery in distant waters would be narrowed. Of these various problem points, that of the North Pacific whale fishery is considered the most serious, and the important thing is to ensure recognition for historical rights, according to the periodical.

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U. S. PUBLIC HEALTH INSPECTOR INVITED TO INSPECT OYSTER GROUNDS:

It was expected that an inspector from the U. S. Public Health Service (perhaps accompanied by a bacteriologist) would spend about one month, beginning late in March, inspecting oyster grounds of Hiroshima Bay and the processing procedures for packing frozen oysters. There were no plans to have the inspector survey any areas outside of Hiroshima.

The United States inspector was invited in connection with the revision of Hiroshima's prefectural ordinance on oyster sanitation. After the revision, oysters from other than designated areas within Hiroshima Prefecture cannot be exported. The inspector's visit to Japan and the revision of the prefectural ordinance were promoted by a Japanese fishing company which is building a new oyster packing plant at Hiroshima. The plant is expected to pack frozen oysters.

The Japanese company explained that the inspector's objectives were limited to areas within Hiroshima Prefecture. (Suisan Tsushin, February 25, 1960.)



Republic of Korea

EXPORTS OF FISHERY PRODUCTS HIGHEST IN SIX YEARS:

The Korean Office of Marine Affairs has announced that Korean fisheries exports in 1959 totaled 7,602 metric tons, valued at US\$4.2 million. The figures represent 53 percent of the export target as to quantity and 65 percent as to value of the original export goal for the year.

In spite of the trade suspension with Japan on June 15, 1959, fisheries exports increased by more than \$490,000 over the previous year and the 1959 total was the highest in value since 1953.

Fisheries products were exported to 12 countries, with Japan the leading purchaser (76 percent of total), followed by Southeast Asian nations, and the United States. Major export items were dried

Republic of Korea (Contd.):

cuttlefish, laver, and fresh and live fish in order of value.

Fishery products represent the best potential source for expending Korean export earnings. The 1959 development is encouraging, but the trade suspension between Korea and Japan is still an impediment to further expansion of fisheries output, the United States Embassy in Seoul reported on February 12, 1960.



Malaya

JAPANESE VESSEL LANDS FIRST TRIP OF TUNA:

The *Koshin Maru No. 5*, the first Japanese tuna fishing vessel to be sent to sea by a joint Malayan-Japanese fish canning firm, returned to Penang on February 10, 1960, from its initial trip in the Indian Ocean with a catch of 47 metric tons. The catch was 7 tons over the quota for the trip. Very little of the catch was expected to be sold locally. The greater part is to be canned or frozen for export.

Upon hearing of the success of the first trip, the company's managing director stated that the company did not intend to compete with any offshore fishing operations by Chinese and Malay fishermen in the Malayan Federation. The Minister of Agriculture stated that his ministry would see to it that the livelihood of the offshore fishermen, already near the bottom of the income scale, was not thrown out of balance.

The Minister announced that the Malayan-Japanese company, the Government, and the fishing cooperatives were developing a plan for the training of selected local fishermen in deep-sea operations, the United States Embassy in Kuala Lumpur reported on February 15, 1960.



Mexico

JAPANESE FISHING VESSELS ARRIVE AT ACAPULCO:

On January 17, 1960, two former Japanese fishing vessels with Japanese crews arrived at the Mexican west coast port of Acapulco. It is reported that the two vessels (now named the *Yolanda* and the *Cecilia*) are to be used in the training of Mexican fishermen and to aid the Government and the fishing industry in its program to provide plentiful and inexpensive fish for Mexico. The vessels were received by the Director of Fisheries and representatives of one of the large fishing firms.



SHRIMP INDUSTRY TRENDS, FEBRUARY 1960:

The Guaymas shrimp fleet on Mexico's west coast of about 150 boats as of mid-February had been tied up since mid-January. Only cooperative-owned boats (reported to be about 20) were fishing. The boat owners claim they could not profitably fish for the sizes of shrimp found off Guaymas at the prices they must pay the cooperatives. As of mid-February an agreement had not yet been reached on the proposal to limit bonus payments to large shrimp. The Guaymas fleet had been catching mostly small-sized brown shrimp.

The west coast Mazatlan and Salina Cruz shrimp vessels, which have been catching larger shrimp, continued to fish and catches were reported good. Some Salina Cruz boats landed as much as 8 or 9 tons of headless shrimp during a 12-day trip.

The east coast Carmen-Campeche area landing-per-boat during January improved somewhat over December. Carmen landings averaged about one metric ton of headless shrimp per trip and those for Campeche about 1.2 tons. About 60 percent of the Carmen landings were 30 count and under per pound whereas about 80 percent of the Campeche landings were under 30 count. Carmen landings ran about 50 percent pink, 35 percent white, and 15 percent brown shrimp. Campeche landings were about 90 percent pink and 10 percent white.

Mexico (Contd.):

shrimp, with but a smattering of brown shrimp.

During the last week in January ex-vessel prices in U. S. cents a pound for headless brown shrimp at Salina Cruz and Carmen were: under 15 count, Salina Cruz 47 and Carmen 58; 15-20 count, Salina Cruz 45 and Carmen 53; 21-25 count, Salina Cruz 33 and Carmen 43; and 26-30 count, Salina Cruz 27 and Carmen 38. Ex-vessel prices for smaller than 30 count shrimp at Salina Cruz were 25 cents for 31-40 count, 20 cents for 41-50 count, and 15 cents for over 51 count; and at Carmen, 34 cents for 31-35 count, 29 cents for 36-40 count, 24 cents for 41-50 count, and 17 cents for 51-65 count. White shrimp prices at Salina Cruz were about 2 cents a pound higher, but most of the landings there were made up of brown shrimp.

The Mexican Chamber of Fisheries, the cooperatives, and Government officials are each undertaking cost surveys in preparation for contract negotiations which are scheduled for signature in May, the United States Embassy at Mexico City reported on February 12, 1960.



Morocco

CANNED SARDINE PRODUCTION
QUOTA ESTABLISHED:

At a meeting on February 13, 1960, of a committee including Moroccan Government and fish canning industry representatives, the quota for the production of canned sardines was established at 1,900,000 cases of 100 cans each for the 1960/61 season beginning in June 1960. Since 200,000 cases remain to be packed out of the present season's quota of 1,300,000 cases, the real limit is 2,100,000 cases. This quota is not considered restrictive since this number of cases can be packed only if the catch is very good. The cannery were assured by the Government representatives that the regular 600,000 cases of Moroccan sardines would be admitted into France free of duty.



Netherlands

PROFITS FROM ANTARCTIC
WHALING FOR 1958/59
SEASON HIGHER:

The management of the Netherlands Antarctic Whaling Company reports that the results for the 1958/59 fiscal year (July 1-June 30) appear to be favorable enough to warrant a cut in the Government subsidy which will be only 1.9 million (US\$503,300) as compared to 3.7 million guilders (\$980,100) for the preceding fiscal year. Total income amounted to 18 million guilders (\$4,768,200) as compared to 17.2 million guilders (\$4,556,300) for fiscal year 1957/58. Operation costs dropped from 12.7 million guilders to 11.8 million guilders (\$3,364,200 to 3,125,800). Since guarantee payments were first made in the 1951/52 fiscal year, the Government has paid the company a total of 34.4 million guilders (\$9,112,600). The management proposes to pay an unchanged six percent dividend.

Table 1 - Netherlands' Production of Whale Products by the Factoryship Willem Barendsz, Seasons 1957/58 and 1958/59

Product	1958/59	1957/58
	(Metric Tons)	
Whale oil	18,663	17,295
Sperm oil	2,295	2,126
Whale meal	3,698	2,302
Vitamin oil	12	15
Whale bones	38	43
Sperm whale teeth	0.711	0.625

The whale oil was sold at an average price of 769.23 guilders (\$210.92) per ton. Sperm oil brought an average price of 591.65 guilders (\$156.73) per ton and whale meal 597.43 guilders (\$158.26) per ton. The other products were also sold. The total value of the entire production by the factoryship Willem Barendsz was 17,987,025 guilders (\$4,764,800) as compared to 17,050,957 guilders (\$4,516,800) during the preceding year.

The Company reports that the new refrigerating plant of the Willem Barendsz is able to process about 1,500 metric tons of whale meat per season. The production of whale meat in the 1959/1960 and the 1960/1961 seasons has already been sold in advance. The management is planning to expand the

Netherlands (Contd.):

frozen whale meat output which is reported to yield satisfactory prices, the United States Embassy at Amsterdam reported on February 15, 1960.



New Zealand

CANNERY EXPECTS TO BUY TUNA FROM JAPANESE VESSELS:

A Japanese group early this year received from a New Zealand canning company an inquiry requesting the group to send a number of Japanese tuna long-line vessels to operate in the mid-southern area of the Pacific Ocean so that they could provide the New Zealand company with tuna. The company is reportedly building a sizable canning plant at Rarotonga, Cook Island (part of New Zealand). The cannery is expected to start packing vegetables, fruits, and fish, particularly tuna, in April. The company indicated that the canned tuna would be consumed in New Zealand.



Nicaragua

SHRIMP INDUSTRY:

Production of shrimp (headless, dried, and peeled and deveined) in Nicaragua increased from about 110,000 pounds (product weight) in 1956 to about 216,000 pounds in 1958. The production in 1959 (based on figures for first eight months of 1959) should be close to 1 million pounds, according to estimates made by the Nicaraguan Ministry of Economy.

	Jan.-Aug.		1958	1957	1956
	1959	1958			
Quantity (1,000 lbs.) . .	507	353	716	115	110
Ex-vessel value (US\$1,000) . .	215	165	340	47	40
Ex-vessel value (U.S. cents/lb.)	42.4	46.7	47.5	40.1	36.4

There are no statistics on the catch by species, but observers estimate that close to 95 percent of the catch is white shrimp (*Penaeus schmitti*). Most of the balance is believed to be brown shrimp (*Penaeus aztecus*) with very small quantities of pink shrimp (*Penaeus duorarum*). Most of the production for 1958 and 1959 was headless shrimp for export. The principal fishing season is from August through March.

The active shrimp fishing fleet as of December 7, 1959, consisted of 5 shrimp trawlers and a trawler-freezer ship (104 feet in length). Two additional vessels were available, but were hauled out for repairs. There is also a 104-foot re-

frigerator vessel that is used for transporting ice and frozen shrimp. All these vessels are Diesel-powered and range from 32 to 69 feet in length. In addition, there are a number of dugout canoes that fish for shrimp with cast nets in Pearl Lagoon. Most of the fishing is around Cape Gracias a Dios, and occasionally pink shrimp is caught near Punta Mico.

As of December 1959 there were two firms operating shrimp trawlers and producing shrimp for export. One of these firms has a processing plant under construction at El Bluff, and plans call for a freezing capacity of 35,000 pounds in six hours. This firm has seven shrimp vessels available and is reported to be contracting for additional vessels from Costa Rica and Panama. Plans call for a fleet of 60 vessels in the future. The second firm operates the trawler-freezer ship as an independent operation. Nicaragua's potential shrimp production by trawlers only is about 750,000 to 1,500,000 pounds of headless shrimp a year.

Costs of producing shrimp for export are unknown. The firm with the plans for expansion is offering independent vessels 23 U.S. cents a pound under the New York wholesale selling price. Actual fishing costs for independent vessels are not known since none had started to operate as of December 1959. Crew shares would be less than in Panama, but ice and Diesel fuel would be higher. Over-all costs of producing shrimp for export would be increased by exchange control, which amounts to 2-8 U.S. cents a pound and ocean freight to Cristobal, where shrimp are stored for export to the United States, is about 2 U.S. cents a pound.

It is estimated that about 75 percent of the shrimp landed are 21-30 count a pound, about 5 percent under 20 count, and the remaining 20 percent over 30 count.

Actual exports of shrimp are unknown as the shrimp exports are combined in the official records with other shellfish and turtles. Exports to the United States are mostly frozen shrimp and live turtles, plus small quantities of spiny lobster tails. Exports are shipped on consignment to New York brokers.

Table 2 - Nicaragua's Exports of Shellfish, 1957-58 and Jan.-Aug. 1959

Country of Destination	Jan.-Aug. 1959		1958		1957	
	Qty.	Value	Qty.	Value	Qty.	Value
	1,000 Lbs.	US\$ 1,000	1,000 Lbs.	US\$ 1,000	1,000 Lbs.	US\$ 1,000
United States	340.0	150.4	604.0	315.7	-	-
Panama	15.0	5.3	6.0	3.6	1.5	0.7
Other	0.2	0.2	-	-	1.3	0.6
Total	355.2	155.9	610.0	319.3	2.8	1.3

Note: According to U. S. customs records, Nicaragua exported 277,588 pounds of shrimp in 1958 and 213,000 pounds of shrimp in 1959. Balance of exports to U. S. from Nicaragua is mostly live turtles.

There are no export taxes on shrimp, but export permits are required and there is currency control. For currency purposes shrimp is valued at 35 U.S. cents a pound. The official rate of exchange is 7 cordobas to US\$1. The free rate for dollars fluctuates between 7.15-7.60 cordobas. In order to obtain an export permit, dollars in the amount of 35 cents a pound of shrimp must be obtained on the free market and deposited with the National Bank which returns the money at the official rate of 7 cordobas to US\$1. This is equivalent to an export tax of 2 to 8 cents a pound.

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SHRIMP INDUSTRY TRENDS, THIRD QUARTER 1959:

Exports of frozen shrimp from Nicaragua during the third quarter of 1959 amounted to about 98,000 pounds, valued at US\$32,236, or lower by about 7,000 pounds in quantity and \$14,080 in value

Nicaragua (Contd.):

as compared with the second quarter of 1959. Nearly all the third quarter exports were to the United States.

Domestic consumption of shrimp is reported to be increasing gradually and the French-owned Caribbean Coast processing plant at Bluefields is vigorously seeking outlets both in the domestic market and in foreign markets. The plant, only partially completed, is operating at a capacity of 5 metric tons a day. When completed by mid-1960 it will have a capacity of 30 tons a day.

A Panama-based company has been granted a 10-year concession to fish for shrimp off Nicaragua's Caribbean coast. As of mid-February 1960 no effort has been made towards exploiting this concession. (The United States Embassy at Managua reported on February 16, 1960.)



Norway

FISHERY LANDINGS INCREASED IN 1959:

Landings of fish and shellfish by Norwegian fishermen in 1959 amounted to 1,369,665 metric tons, or about 130,800 tons greater than the landings in 1958. The ex-vessel value of the landings was Kr.664.7 million (US\$93.1 million), higher by about Kr.82.4 million (US\$11.5 million) than the ex-vessel value for 1958. The landings in 1958 were the lowest since 1949.

The cod and herring fisheries are still the mainstays of the Norwegian fisheries, especially the herring fishery which, however, has shown great variations in landings through the last four years. But landings of species other than herring and cod increased during the 1956-1959 period both in quantity and ex-vessel value. Therefore, alternatives to the risky winter herring fisheries have appeared.

The value of deep-water shrimp catches increased in 1959 by more than 9 million kroner (US\$1.3 million), and the Norway eel pout fishery in the North

Sea--for the first time recorded in Norwegian fishery statistics--yielded about 20,000 tons, at the same time as a further increase of the sand eel fishery took place. Thus fish meal and oil factories in the southernmost districts had supplies of raw material other than herring. The herring fisheries have seen a promising development of a trawl fishery.

Squid fishing in Northern Norway, which suddenly gained importance in the 1958 statistics with landings of nearly 10,000 tons, dropped in 1959. The saithe or coalfish landings reached 90,000 tons.

Future development of the Norwegian fisheries was discussed eagerly in 1959. In spite of opposition it is to be expected that the Norwegian deep-sea fishing fleet will tend to increase in number and size of vessels, and engage further in fishing in distant waters. (The Fishing News, vol. 6, April 1959.)

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EXPERIMENTS WITH FLOATING TRAWLS IN WINTER HERRING FISHERY:

During the 1960 winter herring fishery, the Norwegian research vessel Thor Iverson was scheduled to try out "floating trawls" for the first time in that fishery. The experiments are being made off the west coast of Norway. (News of Norway, January 7, 1960.)

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WINTER HERRING FISHERY STARTS LATE:

The Norwegian winter herring fishery commenced on February 2, 1960, the latest recorded starting date for this vital fishery which accounts for a major part of the total annual Norwegian fish landings. As of the above date in 1959, over one million hectoliters (102,500 short tons) of herring had been landed, but bad weather during much of the remainder of the 1959 season caused the fishery to fail for the second year in succession.

Catches during the first few days of this season have been disappointingly small and while there still remains some hope for a fair season, the herring fish-

Norway (Contd.):

ermen fear that unless large catches are taken soon, the fishery may fall again in 1960.

Taking into account the reduction in the herring stocks and the tendency of the shoals to approach the coast farther north where the fishing conditions are more adverse, the Government's estimate for the 1960 winter herring catch, which was made well before the start of the season, is only five million hectoliters (512,500 short tons) or 500,000 hectoliters (51,250 short tons) greater than the catch last year. In 1956, a record 12.3 million hectoliters (1,260,750 short tons) of herring were taken.

The winter herring fishery off the Sunnmøre coast of West Norway traditionally ends February 15. According to all calculations, the herring should have reached coastal waters by then. But, though the whole fishing fleet tried its luck on the banks, catches remained distressingly small. Nor was there much herring 25 nautical miles at sea, reported some of the biggest purse-seiners.

Fishery specialists aboard the Norwegian ocean research vessel G. O. Sars, which first located huge herring shoals at a distance of some 145 nautical miles off West Norway, expected the main influx to reach coastal spawning grounds. Even so, prospects for a good catch of the fat winter herring would seem rather dim. As of February 3 total landings amounted to less than 18,000 metric tons, with a first-hand value of about Kr.500,000 (US\$70,000). At the same time last year, Norwegian fishermen had brought ashore nearly 120,000 tons which represented a value of about Kr.25,000,000 (\$3.5 million).

The fleet of some 2,500 small and large fishing craft, with crews totaling almost 20,000, waited impatiently in and around the port of Aalesund for about three weeks. Most of the vessels were kept in constant readiness to take off for the fishing grounds on a minute's notice from research vessels. About 150 more nylon purse-seiners are in use this year, bringing the total to

nearly 250. Each nylon net costs from Kr.95,000 to Kr.120,000 (\$13,000-16,800), of which 20 percent is subsidized by the State. While nylon nets are much stronger than those made of cotton they also cost a great deal more.

The herring have been approaching the Sunnmøre coast at a somewhat slower pace than in former years, due to a cold water front stretching far out into the Norwegian Sea. And they have been moving at a depth far beyond the reach of purse-seiners, though that may change in the warmer water found on the spawning grounds.

According to oceanographer Finn Devold, Norwegian fisherman would be well advised to spread their activities over a longer part of the coast. For, judging from all indications, the exceptionally large concentration of winter herring off the Sunnmøre coast is likely to be a thing of the past. For some years to come, he predicted, the herring will probably show up all along the west coast, from Møre to the Röst bank in North Norway.

Greater participation in the North Sea fat herring fishery has been urged as a means of diversifying activities. Right now, large catches are being made only a couple hours' time from the southwestern port of Egersund. For various reasons, only a few Norwegian vessels are taking part.

One of the advocates of larger participation in the North Sea is the Norwegian Fisheries Minister. In a recent interview he said more purse-seiners should give the North Sea a try, rather than staking all on the coastal winter herring fishery. If the latter were to fail for the third year in a row, seiners would be hard put to pay for their costly equipment, he stressed.

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1960 FAT HERRING FISHING SEASON ENDS:

Although some herring appeared off the west coast of Norway on February 2, 1960, the main winter herring shoals did not arrive until ten days later. Due to the extremely late arrival, the "large" or "fat" herring season was extended by

Norway (Contd.):

one week to February 21 and came to an end at midnight on February 23. This is of much significance to the fishermen as the Government-controlled ex-vessel price for the herring is three kroner (about 42 U. S. cents) higher per hectoliter (about 205 pounds) during the "winter" or "fat" herring season than during the "spring" herring season which follows. The lower price is paid when it has been determined that the fat content of the herring has gone below a certain point.



On the herring fishing grounds off the west coast of Norway. Photo shows about 150 tons of herring concentrated in the bag section of a large purse seine which has been tied up to the fishing vessel. Fish are now ready for brailing on board the vessel.

As of February 17, only 1.1 million hectoliters (225.5 million pounds) or about 102,286 metric tons of large herring had been landed. Total landings up to the end of the winter "large" herring fishery were only 2 million hectoliters, or about 185,975 tons, the lowest since 1934. In 1959, the "large" herring fishery yielded about 413,850 tons, and was up to about 70,000 tons in 1957. The "fat" herring fishery season in 1958 was a near failure,

with only about 241,000 tons landed. Thus the 1960 "large" herring fishery for the third successive year has been a failure.

It was felt unlikely that combined landings of "large" and "spring" herring would exceed 3.5 million hectoliters, or 325,000 tons.

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FISH FREEZING AND FILLETING ORGANIZATION INCREASED SALES TO UNITED STATES IN FISCAL YEAR 1958/59:

The Norwegian joint sales organization for some 30 fish freezing and filleting firms in Norway accounts for about 85 percent of the total Norwegian production of frozen fish fillets.

The total production of frozen fish by firms selling through the Organization amounted to 19,750 metric tons for fiscal year 1958/59 (July 1-June 30), or about the same as in the preceding fiscal year. Exports in fiscal year 1958/59 totaled 17,400 metric tons, valued at 56.8 million kroner (about US\$8 million), as compared with 17,750 metric tons, valued at 51.9 million kroner (US\$7.3 million), in fiscal year 1957/58.

The volume of exports to the United States, the Organization's principal market, increased substantially from 2,090 tons in 1957/58 to 7,408 tons in 1958/59. This was the most significant development with respect to the Organization's export sales and, according to the annual report of the Organization, the United States market has definitely become more favorable for Norwegian exports than it has been for many years.

The report states that the sales of the Organization have been limited by the uneven supplies of fish and the consequent frequent poor utilization of the plant's total capacity. Another factor which affects the sales of the frozen fish fillets is the price of the raw fish. In this connection, the report speaks strongly against the policy of the fishermen's marketing association of setting higher ex-vessel prices for fish sold to the freezing and filleting industry than to the other fish-processing industries.

The Organization does not expect any substantial increase in sales to come

Norway (Contd.):

from Norway's affiliation with the European Free Trade Association and warns that the competition will continue to be very strong. It feels instead that, apart from the United States, the United Kingdom, and Sweden, the best prospects for increasing sales of frozen fillets are in the Common Market countries, and for this reason declares that it is very important for the industry that the countries of the "Outer Seven" reach an accommodation with the "Inner Six." (The United States Embassy at Oslo reported on January 13, 1960.)

STERN-FISHING TYPE TRAWLERS BEING BUILT:

An Aalesund, Norway, fishing company has contracted for two 77-foot stern trawlers, according to a report in *Fiskaren* (January 20, 1960), a Norwegian fishery trade paper. They are the first of their type to be built in Norway and much is expected of them. Construction of the first one already is under way and it is expected to be delivered in April or May. The second will be completed by the end of the year. They will be equipped with 360-hp. high-speed Diesel engines and have accommodations for ten men. The vessels will have the most modern equipment, but no freezers, because they are designed primarily for coastal trawl fishing.

TRADE AGREEMENT WITH CZECHOSLOVAKIA INCLUDES FISHERY PRODUCTS:

Norway and Czechoslovakia have concluded a new protocol to the basic trade agreement of March 20, 1947. The new protocol lists fishery in other commodities (together with quotas) which Norway will exchange with Czechoslovakia during 1960. The following fishery products and quotas are listed for export from Norway to Czechoslovakia: (1) fish oils, refined and for technical use, 5,000 metric tons; (2) medicinal cod-liver oil, 800 tons; (3) fresh, frozen, and salt her- ring, 14,000 tons; (4) fish fillets, 2,500 tons; (5) miscellaneous fish products,

including mackerel and tuna, 1,000 tons; (6) canned fish valued at N.kr. 3 million (US\$420,000); (7) fish meal, 2,000 tons; and (8) pearl essence valued at N.kr. 500,000 (US\$70,000). No fishery products are listed for export from Czechoslovakia to Norway.

TUNA LANDINGS CONTINUE TO DROP:

Norway's tuna landings in 1959 continued to drop. Total 1959 tuna landings amounted to only 2,500 metric tons, worth 4,725,000 Norwegian kroner (US\$661,500), as against landings of 2,850 tons in the previous year and as much as 10,300 tons in the 1955 season. (The *Fishing News*, January 29, 1960.)



Pakistan

SHRIMP INDUSTRY TRENDS OCTOBER-DECEMBER 1959:

The Pakistan shrimp catch the last quarter of 1959 at times was so large that the freezing plants were glutted and facilities for drying and curing were unable to absorb the excess. As a result, there was a sharp drop in prices of shrimp. Since about six additional trawlers had gone into operation during the quarter, the Government suspended for a while the operation of its trawlers so as not to compound the difficulties by bringing in additional shrimp.

In the first quarter of 1960 it is expected that the freezing plant located within the area of the fish harbor at Karachi will be put into operation and thus will increase the freezing capacity by 15 tons daily. The shrimp drying and curing areas are also being expanded. During the first quarter of 1960, however, at least six more trawlers will be added to the fleet. (United States Embassy, Karachi, January 22, 1960.)

FISHERIES TRENDS, FEBRUARY 1960:

The first fish freezing, processing, and canning plant in East Pakistan was scheduled to start operations on Febru-

Pakistan (Contd.):

ary 27, 1960. This plant, operated by a fish preservation and marketing corporation and located at Chalna, is heralded as another foreign exchange earner.

New tuna fishing grounds have been discovered in the Bay of Bengal, but their potential has not been fully determined, the United States Embassy in Karachi reported in a February 25, 1960, dispatch.



Peru

EXPORTS OF FISH MEAL AND FISH OIL UP SHARPLY IN 1959:

Peru's fish meal and fish oil industry continued to expand output rapidly in 1959, producing an estimated 285,000 short tons of fish meal and 19,500 tons of fish oils. The 1959 output of fish meal was more than double the 135,000 tons produced in 1958, and fish oil production was up 70 percent. Relatively good demand kept fish meal prices high during 1957 and 1958, and encouraged expansion of the industry.

Peru's Exports of Fish-Meal and Oil by Country of Destination, 1955-58, Estimated 1959

Item and Country	1959	1958 ^{1/}	1957	1956	1955
(Short Tons)					
Fish meal:					
United States	-	30,590	18,126	7,012	9,193
Germany, West	-	29,378	12,649	2,759	2,331
Netherlands	-	36,295	29,900	17,901	6,082
United Kingdom	-	11,917	1,435	-	518
Other	-	8,418	5,841	6,465	2,507
Total	2,270,000	116,598	67,951	34,137	20,631
Fish oil:					
Germany, West	-	593	1,284	991	-
Italy	-	602	222	-	-
Netherlands	-	616	2,476	840	99
Norway	-	-	646	-	-
Other	-	-	154	60	2
Total	3,18,000	1,811	4,782	1,891	101

1/Preliminary.

2/Estimated exports Jan.-Sept. totaled 202,922 tons, against 84,564 tons Jan.-Sept. 1958.

3/Estimated exports Jan.-Sept. totaled 15,227 tons, against 1,650 tons Jan.-Sept. 1958.

Most of the fish meal is exported, and exports in 1959 were estimated at 270,000 short tons--more than double the volume of 1958. Exports of fish oil in 1959 may reach 18,000 short tons, compared with only 1,811 tons in 1958. The marked increase in fish oil exports

is attributed to a change in the cost of production rate used to compute the export tax. The rate was revised upward from 460 soles (about US\$16.60) per ton to 3,000 soles (about US\$108) thus sharply reducing the export tax. The 460 soles rate had been in effect for the last 15 years. (Foreign Crops and Markets, U. S. Department of Agriculture, February 1, 1960.)

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FISH MEAL AND OIL INDUSTRY:

Number and Location of Reduction Plants: About 63 plants produce fish meal in Peru at the present time. They are located at a number of ports along the Peruvian coast, including the following: Callao (19), Chimbote (17), Paita (4), Huacho (6), Huarney (7), and one or two each in Ilo, Casma, Supe, Chancay, Samanco, and Pisco. Plants vary in size from modern establishments capable of producing 40 metric tons of fish meal per hour during a 20-hour working day to small plants using primitive methods, which produce a few tons per day. It is estimated that about 40 of the 63 reduction plants produce fish oil as a byproduct of the fish meal process.

Production and Proportion of Product to Raw Material: The latest data available on production of fish utilized by the reduction plants are for 1958. These data show that 737,019 metric tons of anchovies were landed in that year, and that 126,909 metric tons of fish meal and 10,271 tons of fish oil were produced. Proportions vary according to the size of fish, but as a general rule, one metric ton of fish meal requires 5-1/2 to 6 tons of anchovies. The average oil yield is 1-1/2 to 2-1/2 percent, but may reach 5 percent. No fish solubles are produced.

Domestic consumption of fish meal, which has increased considerably in the past two years, is now about 10,000 tons per year. Thus, 1959 fish meal production may run over 280,000 tons. In November 1959 a trade representative looked for the continuation of the 1959 level in 1960, although a subsequent estimate, made in January 1960, placed this year's production at 300,000 metric tons. Fish oil production for 1959 is expected to show a 70-percent increase.

Value of Each Plant: A moderate-sized plant producing 500 to 800 metric tons of fish meal per day costs an estimated 5 million soles (US\$183,000), of which 3 million soles (US\$110,000) are for plant, machinery, and equipment, and 2 million soles (US\$73,000) for fishing vessels.

Cost of Production: The figures generally quoted by producers of fish meal on production costs have been US\$87 to \$90 per metric ton, and it has even been suggested that efficient producers might be able to show a profit at production costs of \$82 to \$84 per metric ton. However, in mid-January a trade representative stated categorically that the cost of production now is just about \$90, which leaves no margin of profit for producers at the prices being quoted for fish meal, \$80 to \$90 per metric ton, f.o.b. Peruvian ports. Those prices include export taxes and other export charges.

The present production cost figure on which the export tax is based, which was established in April 1956, is the equivalent of \$64.33 per metric ton. The export tax is 10 percent of the difference between the officially-fixed production cost and the price in the United States (Pacific Coast), less freight and insurance. There is an additional 10 percent ad valorem tax (payable on the excess) on all export products, applicable when the export price exceeds by 25 percent the officially-fixed production cost.

The Peruvian fish meal industry is asking the Peruvian Government to appoint a special committee to study the industry to find ways of aiding it in view of declining world prices. Relief in the situation might take the form of a higher official production cost figure, which would reduce export taxes.

Protein Content: The bulk of Peruvian fish meal, which is intended for export, has a protein content of 65 to

Peru (Contd.):

70 percent; export requirements of the trade call for 65 percent minimum protein content. Inferior grades are produced from fish residue and machete, which vary from 60 to 65 percent in protein content.

Fishing Fleets, Ex-vessel Prices, and Crew Shares: As of December 31, 1958, some 3,200 domestic vessels, probably about 75 percent of them unpowered, were reported to be en-

fish meal exports dropped to about 15 percent from 26-27 percent in 1957 and 1958.

Fish oil exports were also up sharply in the January-November 1959 period as compared with both 1958 and 1957. This increase was due to higher production and also to the change made in the established cost of production rate from 460 soles (US\$16.81) to a new rate of 3,000 soles (US\$110) per ton. The old rate, established about 15 years ago, resulted in excessive export taxes.

Table 1 - Peru's Exports of Fish Meal and Oil, 1957-59 (Total Exports and Exports to U. S.)

	Total Exports			Exports to United States			
	Quantity	Value		Quantity	Value		Percent of Total
	Metric Tons	1,000 Soles	US\$ 1,000	Metric Tons	1,000 Soles	US\$ 1,000	
Fish Meal:							
1959 (11 mos.)	247,701	1/	1/	36,982	1/	1/	14.9
1958	105,777	271,100	9,394	27,751	69,800	2,751	26.3
1957	61,645	135,000	4,924	1,444	36,100	1,314	26.6
Fish Oil: 2/							
1959 (11 mos.)	19,374	1/	1/	-	-	-	-
1958	1,443	4,500	1.4	-	-	-	-
1957	4,338	11,400	417	-	-	-	-

1/ Values unavailable.

2/ No exports to United States.

Note: (1) Values converted at rate of 27.36 soles equal US\$1.

(2) Important markets for Peruvian fish meal in 1959: Netherlands (37 percent), Germany (25 percent), United Kingdom (11 percent), and Belgium (8 percent).

gaged in fishing in Peruvian waters. In addition, 122 foreign fishing vessels, said to be American, were engaged in fishing operations. Of these, some 97 were licensed to take fish abroad, and 25 were working under the Peruvian flag for local fishing companies. About 45 percent of the tonnage of fishing vessels is thought to be engaged in anchovy fishing. The actual number is not known. Vessels in greatest demand for anchovy fishing, according to shipbuilders, are of 50-ton capacity, although larger ones up to 150 tons are in service and more are being built.

The number of men in each crew varies with the size of the vessel: 40- to 60-ton boats average 9 to 10 crew members; 70- to 90-ton boats, 13-14 crew members.

In mid-November 1959, plants were paying 230 soles (US\$8.41) per metric ton for anchovies at Callao and 250 soles (US\$9.14) per ton at Chimbote.

Wages paid fishermen engaged in anchovy fishing are said to be greater by far than those received by workers in any other employment in Peru. They are paid according to tonnage of the catch, the sum of 90 soles (US\$3.29) per ton being the current rate. It is divided among master of the vessel and crew, the former's share being 1-1/2 times that of individual members. Since a vessel may make two daily trips carrying upwards of 50 tons each trip, each man can make up to 1,000 soles (US\$36.55) per day.

Anchovy Landings and Fishing Season: The anchovy catch in 1958 is reported to have been 737,019 metric tons. Since fish meal production for 1959 is expected to be more than double that of 1958, an anchovy catch of close to 1.75 million tons seems likely. The fishing season extends from October to May.

Fish Meal and Oil Exports: Fish meal exports for January-September 1959 were 184,090 tons, compared with 76,716 tons in the same period of 1958. An estimate for the 1959 total fish meal exports is now 270,000 tons, compared with 105,777 tons in 1958.

From 1957 to 1959 (data for first 11 months) exports of fish meal by Peru increased over 300 percent. With the increase in fish meal production, exports to countries other than the United States jumped sharply and accounted for 81 percent of the total exports for the first eleven months of 1959. During that period the United States share of Peru's

Marketing Prospects: As of mid-January, fish meal prices f.o.b. Peruvian ports ranged between US\$80 and \$90 a metric ton. Despite the low prices, representatives of the fish meal and oil industry are confident of the future and state that there is a strong demand for fish meal in Europe. Recent price trends (January 1960) have shown signs of recovery from the late 1959 low level. These trade representatives state that about 70 percent of the anticipated production of fish meal for 1960 has been contracted for and unsold stocks are low. In addition, they claim that all production as of early 1960 had been sold on contracts for future delivery. (United States Embassy in Lima, January 12, 1960.)

Note: Peruvian soles converted at 27.36 soles equal US\$1.

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FISHERIES TRENDS, JANUARY 1960:

The Peruvian fish meal industry has under consideration a proposal for financing, at a cost of 24 million soles (about US\$866,000), a new harbor near Callao exclusively for the handling of anchovies for that industry. Most of the fish meal companies favor the proposal and would be willing to participate in financing the new harbor if the port can be administered by representatives of the fish meal companies.

A new plant for smoking fish was due to be activated by the end of January this year. Under the name of "Hornos del Peru," the plant is expected to have an initial capacity of 500 kilos (1,100 pounds) daily, which can be expanded if demand increases. Reportedly, the smoked fish

Peru (Contd.):

product will sell at 12.5 soles a kilo (about 20.5 U. S. cents a pound) as compared with an average price of 25 soles a kilo (41 U. S. cents a pound) for imported smoked fish. (The United States Embassy in Lima reported on January 25, 1960.)

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FISH MEAL PRICES ADVANCED IN LATE FEBRUARY:

In mid-February this year the Manager of the Peruvian National Fisheries Society stated that fish meal buyers were offering US\$73-75 a ton f.o.b. Peruvian ports, with no sellers. During the third week of February, buyers offered \$78-80 a ton. Reports of low fish meal production in Norway this season (said to be only five weeks long) appear to be responsible for the higher foreign offerings, some of which have come even from Norway.

There have been no developments recently in the organization of an association of Peruvian fish meal producers. The Manager of the Society seems to believe that it will not materialize at least for the present. Fish meal plants of Lima and Callao are temporarily prohibited from using four varieties of edible fish (bonito, machete, caballa, and lorna) in their reduction process. The prohibition extends for four months from February 12, the United States Embassy in Lima reported on February 24, 1960.

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JAPANESE RESEARCH VESSEL VISITS PERU:

The Umitaka Maru, school-vessel of the Fisheries University of Takio, has been making a voyage of scientific and oceanographic investigations, including studies of Peruvian coastal waters. During the voyage, members of the Peruvian National Counsel of Hydrobiological Investigations were aboard. A primary purpose of the visit to Peru was the study of Peruvian fish meal production, with a view of obtaining information to aid in improving Japan's output of that product, the United States Embassy in Lima reported on January 5, 1960.

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Philippines

REPARATIONS COMMISSION REAWARDS JAPANESE-BUILT FLOATING FISH CANNERIES:

The Philippine's Reparations Commission announced on February 18, 1960, that the Japanese-built floating fish canneries and their complement of six fishing boats had been reawarded in separate lots to three different corporations. The boats originally had been awarded to the Estancia (Iloilo) Farrers Cooperative Marketing Association which had not used the boats and had no plans to use them. A packing corporation was awarded the following items: (1) a cannery costing P404,000 (\$202,000), which will be stripped off one of the vessels; (2) three fishing boats with a total cost of P860,175 (\$430,087); and (3) the P114,000 (\$57,000) can manufacturing plant. The vessel which is to be stripped of its cannery equipment was awarded to a shipping company for P1,747,622 (\$872,066). A fishery enterprise was awarded the following items: (1) one floating cannery for P2,151,622 (\$1,073,603); and (2) three fishing boats with a total of P860,174 (\$430,087). (The United States Embassy in Manila reported on February 19, 1960.)

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SHRIMP FISHERY:

According to the most recent statistics available on the landings of shrimp in the Philippines, the catch amounted to about 5.5 million pounds in 1957 and about 8.2 million pounds in 1956. In addition, considerable quantities of shrimp are caught by fishermen engaged in subsistence or personal use fishing which are not included in the statistics.

Practically all of the shrimp caught and landed in the Philippines is consumed within the country. In 1957 the Philippines exported only about 19,000 pounds, valued at US\$2,845, and in 1956 about 7,000 pounds, valued at \$1,254.

In the Philippines no vessels are known to be engaged exclusively in shrimp fishing, but shrimp are taken along with other fish and shellfish. Most of the catch is sold fresh with the balance usually preserved with salt. (The United States Embassy in Manila reported on December 9, 1959.)

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Poland

FISHING INDUSTRY ACHIEVES 1959 PRODUCTION TARGET:

The Polish State-owned fishing fleet, operating in the North Sea and in the Baltic, achieved its target of 110,000 metric tons for 1959 early in December, according to Polish Marine News, published by the Polish Chamber of Foreign Trade in Warsaw.

The 1959 target for the Polish fishing industry was 146,659 tons of fish--110,000 tons by the State-owned enterprises, 19,668 tons by the cooperatives, and 16,791 tons by private fishermen. The landings for the State-owned enterprises were planned to be 15.9 percent higher than those of 1958.

During the first half of the year the cod landings from the Baltic fishing grounds were 11,000 tons lower than planned, while prolonged storms in October and November made it impossible to achieve the normal good results noted during the herring fishing seasons on the North Sea grounds in the past. However, due to the shortening of the time of repairs to the vessels, the putting into service of the mothership *Pulaski*, and the establishment of a base at the port of Sunderland during the best herring fishing season (where a total of 3,650 tons of salted herring was landed), the target of landing 110,000 tons of fish by the State-owned enterprises was reached on December 4. The value of the fish landed was higher by 4.5 percent than planned.

Polish State-Owned Fishing Fleet Landings		
Species	1959 ^{1/}	1958
	(Metric Tons)	
Cod	19,996	25,051
Herring (North Sea)	68,735	55,322
Herring (Baltic)	8,793	9,488
Sprats	7,902	2,769
Salmon	25	20
Mackerel	3,861	1,796
Flat fish	130	180
Other salt-water fish	570	265
Total	110,012	94,891
1/Up to December 4.		

The report continues, "The deep-sea fishery was influenced by the actual requirements of the market and for this reason the landings of salted herring for the home market amounted to 95 percent

of the total landings, the remaining 5 percent being white fish and mackerel. The deep-sea fleet in practice fishes herring from April to November, fishing in the remaining 4 months having been discontinued."

During the period from January up to the end of November the State-owned fishing flotilla consisted of 39 large trawlers, 15 trawlers, 50 drifter trawlers, 3 drifters, 74 cutters, 154 56-foot cutters, and 14 49-foot cutters.

To organize fishing all the year round, as well as to increase the landings from distant waters, the existing fishing fleet is being modernized and up-to-date factory trawlers are being built.

To increase the operating range of the coalburning steam-trawlers they are being reconstructed into fuel-oil burners; to improve safety conditions on the North Sea grounds, the vessels are being equipped with radar. The first factory-trawler will be handed over by the Gdansk shipyard in 1960. Thus the distant-water fishing fleet will be able to supply large quantities of fresh and frozen fish for the home market in the near future. (*The Fishing News*, January 29, 1960.)



Portugal

CANNED FISH EXPORTS, JANUARY-OCTOBER 1959:

Portugal's exports of canned fish during January-October 1959 amounted to 60,966 metric tons (3,327,000 cases), valued at US\$31.3 million as compared with 53,725 tons, valued at US\$28.6 million for the same period in 1958. Sardines in olive oil exported during the first ten months of 1959 amounted to 45,415 tons, valued at US\$22.0 million.

Portuguese Canned Fish Exports, January-October 1959		
Species	Metric Tons	US\$
Sardines in olive oil	45,415	22,033
Sardine & sardinelike fish in brine	1,303	268
Tuna & tunalike fish in olive oil	3,410	2,382
Anchovy fillets	5,367	3,933
Mackerel in olive oil	3,064	1,531
Other fish	2,407	1,163
Total	60,966	31,310

Portugal (Contd.):

During January-October 1959, the leading canned fish buyer was Germany with 13,465 tons (valued at US\$6.8 million), followed by Italy with 8,814 tons (valued at US\$5.0 million), United States with 5,752 tons (valued at US\$3.9 million), Great Britain with 5,601 tons (valued at US\$2.6 million), and France with 3,843 tons (valued at US\$2.0 million). Exports to the United States included 2,162 tons of anchovies, 822 tons of tuna, 2,564 tons of sardines, and 38 tons of mackerel. (*Conservas de Peixe*, December 1959.)

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CANNED FISH PACK,
JANUARY-OCTOBER 1959:

The total pack of canned fish for January-October 1959 amounted to 48,147 metric tons as compared with 46,580 tons for the same period in 1958. Canned sardines in oil (36,790 tons) accounted for

Portuguese Canned Fish Pack, January-October 1959		
Product	Metric Tons/L	1,000 Cases
In Olive Oil:		
Sardines	36,790	1,936
Sardinella fish	562	29
Anchovy fillets	4,711	471
Tuna	4,295	154
Mackerel	563	22
Other species	1,226	65
Total	48,147	2,677
L/Net weight.		

76.4 percent of the January-October 1959 total pack, up by 17.9 percent from the pack of 31,198 tons for the same period of 1958, the December 1959 *Conservas de Peixe* reports.



Spain

VIGO FISHERIES TRENDS,
OCTOBER-DECEMBER 1959:

Fish Exchange: Fish landings for the fourth quarter of 1959 totaled 23,280 metric tons, an increase of 1,644 tons over the third quarter and 453 tons over the fourth quarter of 1958.

The total value of the catch for the fourth quarter calculated in U. S. dollars (at 60 pesetas to the dollar) was \$3,197,017 as compared with \$3,723,000 for the third quarter of 1959 and \$4,409,039 for the fourth quarter of 1958 (calculated at the 1958 official rate of exchange of 42 pesetas to the dollar).

The increase in landings for the fourth quarter of 1959 as compared with the same quarter of 1958 is attributed to the very successful sardine season, which more than compensated for the poor over-all landings in December because of bad weather. The sardine landings for the fourth quarter totaled 11,186 tons, almost double the 5,860 tons landed in the fourth quarter of 1958. The sardine catch for the third quarter of 1959 was 5,574 tons. Other important species landed in the fourth quarter of 1959 were small hake, horse mackerel, and pomfret, the latter increasing from 759 tons in the final quarter of 1958 to 1,757 tons in October-December 1959.

Landings of the highly-favored hake dropped from 259 tons in the fourth quarter of 1958 to 119 tons in the corresponding quarter of 1959, with the average price per kilo rising from 45.73 pesetas to 63.30 (45.4 to 47.8 U.S. cents a pound).

The average price per kilo at the Exchange for the total catch was 8.33 pesetas (6.3 U.S. cents a pound) in the fourth quarter of 1959 as compared with 10.32 pesetas (7.8 U.S. cents a pound) for the third quarter and 8.11 pesetas (8.8 U.S. cents a pound) for the fourth quarter of 1958. The spread between the average price in the third and fourth quarters was due to the scarcity of the high-priced albacore and the higher landings of the low-priced sardines in the fourth quarter of 1959.

Preliminary estimates for the 1959 landings at Vigo give a total of 77,264 metric tons, with a value of 790,920,000 pesetas (US\$15,508,000 at average rate of 51 pesetas to US\$1), an increase over the 1958 total of some 13,000 metric tons and 173,979,000 pesetas (US\$3,411,000). The 1959 increase, due largely to the increased sardine catch, reversed a trend in recent years of declining landings at Vigo.

Fish Canning and Processing: The fish canning industry purchased 3,766 tons of fresh fish from the Vigo Fish Exchange during the fourth quarter of 1959, as compared with 6,575 tons for the third quarter, and 5,260 tons for the fourth quarter of 1958. For 1959, the total purchased by the canning industry was 12,383 tons, slightly under the 12,807 tons purchased in 1958.

Other processors, including smokers, driers, and fish-meal plants purchased 5,569 tons during the fourth quarter of 1959, in contrast with 3,467 tons during the third quarter and 3,568 tons during the fourth quarter of 1958. The total for 1959 was 14,386 tons, more than double the 6,672 tons purchased from the Exchange during 1958.

Canning activity fell off during the fourth quarter, and was lower than the activity of the final quarter of 1958 largely due to the shortage of sardines of a quality suitable for canning. Although the sardine catch was unusually large during the quarter, it was, for the most part, small size fish purchased by the fish-meal factories. It was the abundance of small sardines at very low prices throughout the late summer and the fall of 1959 that was largely responsible for the greatly increased purchases by "other processors."

Exports: Although the canners have had a very successful year in the export market, sales to the domestic market are reported to be down. While no figures are available to substantiate these reports, it has been estimated by a reliable source that shipments of canned fish to the large consuming centers of Madrid and Barcelona during October-December 1959 were down 60 percent from the corresponding period of 1958.

No figures on canned fish exports for 1959 from the northwest region are available. However, an official of the Ministry of Commerce believes the total volume of exports will be double that for 1958. Of significant importance were increased exports of canned albacore tuna to the United States. One of the largest Vigo canners stated that his exports to the United States (almost entirely albacore) were five times greater in volume than in 1958, and asserted that he could easily double the 1959 figure if albacore catches are more plentiful in 1960.

The canners' optimism over the future of the export market is dependent upon a continued and increasing supply of fish. While the devaluation of the peseta and the liberalization of tinplate importations have virtually eliminated, for the time being at least, the perennial problems of noncompet-

Spain (Contd.):

itive prices and tinplate shortages, the major problem of an inadequate fishing fleet will probably prevent the canning industry from utilizing its full capacity for export for some time to come.

Cod Market: In the middle of December 1959, the Comisariat of Supply and Transportation published an order (Boletín Oficial del Estado, Dec. 15, 1959) canceling all controls on the prices of cod, for all sizes and species. Previously, only prices on large cod (an estimated 20 percent of the total catch) were free.

The cod industry has long sought the end of government controls on the price of cod. It remains to be seen whether import competition or consumer resistance will be effective in keeping cod prices down. In view of the reportedly poor catches by the Spanish cod fleet in recent months, it is likely that the large cod companies will attempt to raise their prices.



Sweden

HERRING LANDINGS HIGHER IN 1959:

Landings of herring by Swedish fishermen at home and abroad in 1959 are estimated at about 115,000 metric tons, a considerable increase as compared with the 97,000 metric tons landed in 1958. Landings in foreign ports accounted for the larger part of the increase. In Danish ports, Swedish fishermen landed herring and other fish totaling 69,000 tons as compared with 61,900 tons in 1958. The value of the landings in Danish ports in 1959 was 31,033,000 crowns (US\$5,996,700) as compared with 26,631,000 crowns (US\$5,146,000) in 1958. Of the landings in Danish ports in 1959, food fish other than herring accounted for a very small portion. Industrial fish, however, made up about one-third of the landings, or about 20,000 tons, valued at 3,948,000 crowns (US\$762,900). In 1958, the industrial fish landed in Danish ports totaled 14,000 tons valued at 2,309,000 crowns (US\$446,200).

Direct landings of herring in West German ports by Swedish fishermen, which in 1958 dropped considerably, amounting to only about 25 percent of the landings in 1957, increased in 1959 by almost 500 percent and totaled 7,384 tons, valued at 4,248,000 crowns (US\$820,900). In addition, 500 tons of other fish valued at 288,000 crowns (US\$55,700) were landed in West German ports. The total landings of herring and other fish in West German ports in 1958 amounted to

1,576 tons, valued at 1,163,000 crowns (US\$224,700).

Swedish direct landings of herring in Great Britain, however, continued the downward trend from 1958 and amounted in 1959 to 1,733 tons valued at 852,000 crowns (US\$164,600). In addition, 147 tons of other fish valued at 88,000 crowns (US\$17,000) were landed in British ports. The total landings in 1958 amounted to 2,600 tons, valued at 1,573,000 crowns (US\$304,000).

Data on the total value of Sweden's landings of fishery products is unavailable. But a considerable increase in value as compared with 1958 is expected. The value of the landings in foreign ports in 1959 exceeded the 1958 value by about 7,000,000 crowns (US\$1,352,700). In addition, the turnover in 1959 at the major fish auctions on the Swedish west coast was larger than in 1958. (The United States Embassy in Goteborg reported on February 18, 1960.)



Thailand

SHRIMP INDUSTRY:

The shrimp fishing industry in Thailand consists of many small enterprises scattered along the coast and also inland for fresh-water shrimp. Most of the catch, which is estimated to have averaged about 10,370 metric tons annually for 1956-58, is consumed in Thailand. Small quantities of both fresh, frozen, or dried shrimp are exported (exports varied between 10 tons in 1956 to about 40 tons in 1958 for all types). In 1958, export of frozen shrimp (less than 200 pounds) to the United States was started on an experimental basis. In 1959, according to estimates, frozen shrimp exports to the United States from the Port of Bangkok rose to 23.9 tons, valued at about US\$29,868.

Late in 1959 there were three companies exporting shrimp from the Bangkok area. All three firms used the cold-storage facilities of the semi-Government-owned and operated Cold Storage Organization in Bangkok. Only one of the firms (Japanese) handling and processing shrimp for export has specialized equipment for shrimp fishing.

Most of the shrimp catch is made during the dry season, although shrimp stocks are believed to be available throughout the year. The catch is confined largely to coastal waters, especially in the southern part of Thailand where the largest quantities are caught.

Thailand (Contd.):

In 1957, powered vessels 5 net tons and under totaled 482 and vessels over 5 net tons amounted to 273 for a total tonnage of 5,688. Mechanized fishing vessels increased sharply in number and tonnage in 1958 consisted of 647 vessels of 5 net tons and under and 943 vessels over 5 net tons for a total tonnage of 18,318. In addition, in 1958 there were 601 vessels without power averaging about 6 tons in size. No vessels are used exclusively for shrimp fishing, and a fair portion of the annual shrimp catch is taken by stationary fishing gear, such as bag nets. The Thai Department of Fisheries has a program to provide loans at low interest rates for fishermen to purchase fishing gear and motors. Most of the fishing enterprises are family undertakings, and more and more of the vessels are being mechanized.

Prices paid for shrimp at the auction held by the Fish Marketing Organization in Bangkok from January-September 1959 averaged 42.5 U. S. cents a pound for large shrimp and 24.7 U. S. cents a pound for small shrimp. The price range for large shrimp was from 38.9 to 49.7 (January) and from 21.6 to 26.1 (July) U. S. cents a pound for small shrimp.

Costs of processing shrimp for export based on purchase prices ranging between 30 and 48 U. S. cents a pound are as follows: processing, US\$5.71 a ton; cold-storage, first month \$39 a ton, second month \$32 a ton; transportation to harbor, \$23.80 a ton. Total costs to point of shipment ranged from 33.6 to 50.8 U. S. cents a pound. (United States Embassy in Bangkok, December 22, 1959.)

Note: Values converted at rate of 21 Bahts equal US\$1.

Tunisia

FISHERIES EXPANSION PROMOTED BY GOVERNMENT:

The Tunisian Government-supported Office National des Pêches (ONP) continued to expand its activities during the final quarter of 1959, including acquisition of the important tuna fishery and cannery of Sidi Daoud, the "Société des Madragues Tunisiennes." This French company, according to the Director of ONP, had been given a concession to exploit the major tuna fishing areas until 1990. In 1958, the company's rights in the Monastir area were taken away by order of the President of Tunisia because of its failure to exploit that sector of its concession. Purchase of the Sidi Daoud Company and acquisition of the extensive tuna fishing rights has been presented by the ONP as an opportunity to expand tuna production to meet domestic demand and

to give more employment to Tunisians by keeping the Sidi Daoud fishery open for all or most of the year. It is proposed that production be increased in fishing areas formerly used but abandoned in recent years, commencing with Cap Zebib in 1960, and by employing a 30 meter (98.4 foot) vessel (expected to be completed by the end of 1960) to fish for tuna in the winter months when the fish are not found close to land.

The ONP, already enjoying a virtual monopoly in the relatively profitable lake (or lagoon) fishing and operating some seven trawlers, also moved ahead with plans to build a modern sardine cannery at Sousse. It has also made important progress in its declared goal of establishing a "chain of cold" from the site of the catch to the consumer. Refrigerated trucks are already in operation from the major fishery at El-Biban in the south to Tunis; on January 14 a complex of four refrigerated storage rooms was opened in Tunis Central Market with a capacity of between 20-25 tons. The ONP Director has described the new facility both as a protection to the consumer's health and a facility to control the price of fish. By releasing from cold storage only enough fish to meet consumer demand, it is possible to avoid glutting the market and a subsequent drop in prices. (United States Embassy in Tunis reported on February 4, 1960.)



Union of South Africa

FISH MEAL PRODUCERS SEEK AGREEMENT WITH PERU:

The emergence of Peru as a major fish meal producer has been a source of concern to the South African fish meal and oil industry. Peruvian production is now estimated to be in excess of 200,000 long tons a year and is expected to increase to about 300,000 tons in 1960. The impact of Peruvian production on the world market for fish meal is evidenced by the fact that prices in the United Kingdom have dropped from £57-12-0 (US\$161.28) to £43-2-0 (\$120.68) per long ton in the past four months. This trend has in fact become

Union of South Africa (Contd.):

so disturbing that two representatives of South African fish meal producers visited Peru seeking a marketing, pricing, and production agreement with the Peruvian industry. South African production of fish meal in 1958 amounted to 102,579 tons of which 89,253 tons were exported. Both South Africa and South-West Africa had record catches of pilchards in 1959. (United States Embassy in Pretoria reported on January 25, 1960.)



U.S.S.R.

EXPANSION OF FISHING FLEETS CONTINUES:

The latest addition to the Soviet Union's Baltic fishing fleet is the mothership Svjatogor, which was operating in the Atlantic in December 1959, according to a report in the Soviet publication Vodnyj Transport of December 1959. The vessel is equipped with a helicopter and, in addition to its primary objectives, serves as a base ship for fishing vessels and fishermen, reports on the weather, and scouts for fish schools. The mothership uses the helicopter to deliver mail to the fishing vessels from ships coming from Russian home ports.

The herring factoryship Lamut, of 4,982 gross tons, has been built for the Soviet Union by a Japanese shipyard. The new vessel is part of a larger order placed with Japanese shipyards, which also includes two vessels for tuna fishing, the Dnepr and Dnestr, and another factoryship for the herring fishery, the Nicholai Isaenko.

The Lamut has a production capacity of 120 metric tons of herring per 24 hours and is equipped for both salting and freezing herring or other species. This vessel is well equipped for the comfort of the crew. It has a surgical clinic with an x-ray room, and recreation space with piano, movies, library, and other conveniences. The vessel is 110 meters long over-all, 16 meters in breadth, 9 meters deep, is equipped with a 3,360-hp. engine, and had a maximum speed of 14.6 knots

on its trial trip. (Fiskets Gang, January 21, 1960.)

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FISHING FLEET OPERATING OFF ALASKA:

A Russian fishing fleet was reported operating in the North Pacific off Alaska in full force about a month earlier than usual. At least 50 Russian trawlers and 10 refrigerator and support ships were spotted in the area late in January off the southeast coast of Nunivak Island which is north of Bristol Bay and not far from the Yukon River. The fleet apparently is equipped for bottom fishing for such species as cod, flounder, and sole. Stern-type trawlers were sighted in the fleet.

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LARGE FLEET OF VESSELS FISHING FOR HERRING OFF FAROE ISLANDS:

The Soviet Union's fishing fleet has been averaging a catch of 1,450 metric tons of herring a day off the Faroe Islands recently, according to a report in a Swedish fisheries publication (January 10, 1960). It is estimated that 300-400 Russian vessels are fishing off the Faroe Islands. They are led by almost a score of supply and motherships of about 7,000-8,000 tons each, and tankers. The tankers regularly obtain fresh water in the port of Thorshavn, Faroe Islands, usually 1,000 tons at a time. One of the Russian motherships is equipped with a helicopter. (Fiskets Gang, January 28, 1960.)



United Kingdom

CONTRACT FOR FISH AT FIXED PRICES FOR FREEZING:

A contract for the purchase of supplies of fresh fish valued at £450,000 (US\$1,260,000) was due to be signed late in January 1960 by a large Grimsby, England, processor of quick-frozen fish and other foods. The fish, to be delivered from February 1960 to the end of July 1960, will be obtained from Grimsby and Hull distant-water trawler owners. Un-

United Kingdom (Contd.):

der the contract about £3 (US\$8.40) a kit of 140 pounds (6 U. S. cents a pound) will be paid for fish received. The contract amounts to about 10,000 metric tons.

Another contract for the bulk purchase of fish valued at £1 million (US\$2,800,000) was recently signed by another large Grimsby fishing and processing company. It is understood that a third Grimsby packaged fish firm is negotiating for the purchase of 980,000 pounds of fish at a fixed price.

In 1959 for the first time, fish was sold by trawler owners at fixed prices rather than by auction, as was the custom in the past. The present contracts tend to indicate that as the fish-freezing trade continues to develop, the practice of selling fish under contract at fixed prices is growing.

One of the large packers of quick-frozen fish and other products states that a smaller series of contracts of this nature in 1959 were successful. The firm claims that the agreement will produce dual benefits in the way of high-quality fish at steady prices for the consumer, and a stable market for the trawler owners and their crews. Another important aspect of the signing of the contracts is that the processor is able to quick-freeze as much fish as possible while it is in season. (United States Embassy in London reported on January 22, 1960.)

* * * * *

"SILVER COD" FOR 1959 AWARDED TO HULL VESSEL:

The 1959 "Silver Cod" trophy for 1959 has been awarded to the Hull distant-water trawler *Falstaff*. In 330 days

at sea this vessel landed a total of 39,695 kits or about 5.6 million pounds of fish. The first seven of the eight high-liner vessels for 1959 were from Hull, which is England's main fishing port for large distant-water trawlers.



Unloading a fishing trawler at Grimsby, England. Note movable winch on dock and gang planks on which baskets are pushed down to dock.

The skipper of the *Falstaff* stated that the vessel's speed was a great advantage in winning the award for 1959. He also stated that the *Falstaff* was a very seaworthy vessel, which enabled the vessel to fish in weather when less able vessels were forced to cease fishing. (*The Fishing News*, January 22, 1960.)



Viet-Nam

SHRIMP INDUSTRY:

The average annual catch of shrimp for 1956-1959 is estimated by the Viet-Nam Directorate of Fisheries at 5,000 metric tons. There are no data concerning the species and value of shrimp taken. At the January 1960 average ex-vessel price of 27.5 piasters per kilogram, an annual catch of 5,000 metric tons would be worth 137,500,000 piasters, or US\$3,928,571 at the official rate of exchange of 35 piasters per U. S. dollar.

The Directorate of Fisheries estimates that there are more than 2,000 boats engaged in fishing for shrimp at one time or another during the year. The boats vary in size, but are mostly very small craft powered by sail and oars. A few fishing boats now have gasoline engines.

There are presently no construction programs for shrimp fishing vessels. A new Vietnamese firm organized to catch, freeze, and export shrimp, plans to have five Japanese-built vessels, of 75 to 150 tons, with Diesel power, by the end of 1960. This firm is only now beginning commercial operations. Initial production is expected to be about 600,000 pounds a month. Exports, at least at first, will be made only to the United States. According to reports, the first shipment of frozen shrimp to the United States will be made early in 1960.

Ex-vessel prices for shrimp in Saigon in January 1960 were 30-35 piasters per kilogram (about 38.9-45.4 U. S. cents a pound at official rate of exchange) for large shrimp

Landings by Eight Leading British Vessels in Silver Cod Competition			
Vessel	Days at Sea	Landings	
		Kits (140 Lbs.)	1,000 Lbs.
<i>Falstaff</i>	330	39,695	5,557
<i>Arctic Ranger</i> .	333	37,490	5,249
<i>Prince Charles</i>	336	35,709	4,999
<i>Cape Trafalgar</i>	336	34,933	4,891
<i>Marbella</i> . . .	331	34,518	4,875
<i>Kirkella</i> . . .	334	34,769	4,868
<i>Caesar</i>	343	34,181	4,785
<i>Northern Eagle</i>	333	33,365	4,671

Viet-Nam (Contd.):

and 20-25 piasters per kilogram (25.0-32.4 U. S. cents a pound) for small shrimp. Shrimp are sold only by size, never according to species.

Since 1956 small quantities of dried shrimp have been exported from Viet-Nam. The current market price for dried shrimp exported to Hong Kong and Singapore is 24.14 piasters per kilogram or about 31.3 U. S. cents a pound. Exports of dried shrimp from 1956-59 averaged about 37.5 metric tons per year with about 67.7 percent exported to Hong Kong, 26.7 percent to Singapore, and about 10.7 percent to other destinations.

There are no current export controls (except as part of general licensing of all exports) or taxes on exports of fresh shrimp. Dried shrimp must pay an export tax of 5 percent ad valorem. Earnings of foreign exchange from exports of shrimp must, as is true of all exports, be exchanged for piasters, 65 percent at the official rate of 35 piasters per dollar, and 35 percent at the free rate of approximately 72 piasters per dollar.

The relatively small annual shrimp landings made from Vietnamese waters are not an indication of the available supply. Most shrimp are now caught in shallow coastal waters, bays, and rivers mouths. Deep-water fishing grounds for shrimp have been located at several places off the coast, and it appears that there is a plentiful supply of two or three large species. (United States Embassy in Saigon, January 11, 1960.)

* * * * *

EXPORT OF FROZEN SHRIMP TO UNITED STATES STARTED:

On January 24, 1960, a new Vietnamese shrimp fishing and processing company made its first shipment of quick-frozen shrimp to the United States.

The shipment (due in New York about March 10) of ten metric tons, packed 5-pounds to the carton, was expected to bring about 70 U. S. cents a pound in New York. Less freight charges, the shipment should net the new firm about US\$13,628. For the near future, the company hopes to ship about 30 tons a month. The company's freezing capacity is 60 tons a month, but it is still plagued with difficulties in securing adequate supplies of raw shrimp. At 30 tons a month, foreign exchange earnings for Viet-Nam would approach US\$500,000 a year. The company's present intention is to sell the entire production in the United States.

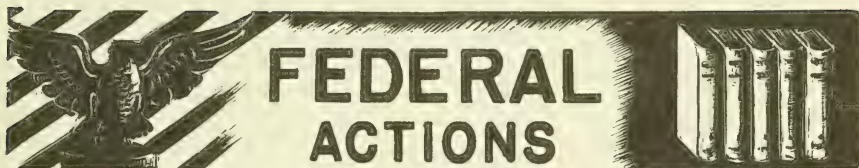
The company is now actively seeking two special shrimp trawlers from Florida or Japan to improve raw shrimp landings. It has also recently sent a sample shipment to New York of special shrimp, found near Soc-Trang on the southern mouth of the Mekong. These shrimp, believed to be unique, have tails 6-8 inches in length. The New York importer's response to the sample was said to be enthusiastic. As an added inducement, the heads (carapaces) are said to be marketable locally for soups. (United States Embassy in Saigon, February 1, 1960.)



CORRECTION

In the article entitled "Report of the Tenth Session of the FAO Conference," the paragraph beginning at the bottom of the second column of page 52 (February 1960 issue of Commercial Fisheries Review) should have read:

Two major proposals by the U. S. Delegation for world conferences were accepted and written into the report of the Technical Committee. The first proposal, dealing with a world conference on the tunas and related species, was received favorably by all delegates; the suggestion was made that the conference be held in Hawaii, because it is a major center for research on tunas, and has excellent facilities for a conference. The other proposal, dealing with a symposium on the nutritive value of fishery products, was also received favorably, and the Committee requested the Director-General to go into the possibility of organizing this symposium as a joint activity of the Fisheries and Nutrition Divisions, subject to the availability of funds.



Department of the Interior

FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

BREADED FISH PORTIONS AND COD FILLETS VOLUNTARY GRADE STANDARDS ISSUED:

Voluntary grade standards for the production of good quality frozen raw breaded fish portions and cod fillets have been approved. The grade standards were published in the Federal Register of February 27, 1960, and became effective 30 days from that date. Notice of intention to establish standards for frozen cod fillets was carried in the Federal Register on November 21, 1959, and for frozen raw breaded fish portions in the Federal Register of December 5, 1959.

The standards were developed by the U. S. Bureau of Commercial Fisheries, after months of research. Well-advertised public meetings in Boston, Chicago, and Seattle, were attended by interested industry groups and by consumer representatives. Suggestions made were given full consideration and in many instances adopted. Acceptance on the part of in-

dividual firms is entirely voluntary. Those who use the USDI continuous inspection service will have the right to mark individual packages to convey this fact to the buyer.

The proposed regulations include product and grade description; factors of quality, including evaluation of flavor, odor, appearance, size, absence of defects, and character; definitions and methods of analysis; lot certification tolerances; and score sheets.

Standards have already been established for frozen fish sticks, fish blocks, breaded shrimp, haddock fillets, and halibut steaks. It is anticipated that grade standards will be established by mid-summer for the production of raw headless shrimp and ocean perch fillets.

In 1959, 29 processing firms produced about 95 million pounds of fishery products. These firms have the right to use the Department of the Interior shields of quality showing "continuous inspection" and additional firms have availed themselves of the lot-sampling service and have had their products certified as being part of a lot which was officially sampled by Bureau inspectors.

Title 50—WILDLIFE

Chapter I—Fish and Wildlife Service, Department of the Interior

SUBCHAPTER K—PROCESSED FISHERY PRODUCTS,
PROCESSED PRODUCTS THEREOF, AND CER-
TAIN OTHER PROCESSED FOOD PRODUCTS

PART 176—UNITED STATES STAND- ARDS FOR GRADES OF FROZEN RAW BREADED FISH PORTIONS¹

On page 9787 of the FEDERAL REGISTER of December 5, 1959, there was published

¹ Compliance with the provisions of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act.

a notice of a proposed new part 176 of Title 50, Code of Federal Regulations. The purpose of the part is to issue United States Standards for Grades of Frozen Raw Breaded Fish Portions under the authority transferred to the Department of the Interior by section 6(a) of the Fish and Wildlife Act of August 8, 1956 (16 U.S.C. 742e).

Interested persons were given 30 days within which to submit written comments, suggestions or objections with respect to the proposed new part. Comments were received and considered and the proposed new part is hereby adopted without change and is set forth below. This amendment shall become effective at the beginning of the 30th calendar

day following the date of this publication in the FEDERAL REGISTER.

Dated: February 23, 1960.

ELMER F. BENNETT,
Acting Secretary of the Interior.

PRODUCT DESCRIPTION AND GRADES

Sec.	
176.1	Product description.
176.2	Grades of frozen raw breaded fish portions.

FACTORS OF QUALITY

176.11	Ascertaining the grade.
176.12	Evaluation of the unscored factor of flavor and odor.
176.13	Evaluation and rating of the scored factors: Appearance, uniformity, absence of defects, and character.
176.14	Appearance.

- 176.15 Uniformity.
176.16 Absence of defects.
176.17 Character.

DEFINITIONS AND METHODS OF ANALYSIS

- 176.21 Definitions and methods of analysis.

LOT CERTIFICATION TOLERANCES

- 176.25 Tolerances for certification of officially drawn samples.

SCORE SHEET

- 176.31 Score sheet for frozen raw breaded fish portions.

AUTHORITY: §§ 176.1 to 176.13 issued under sec. 6(a), Fish and Wildlife Act of August 8, 1956; 16 U.S.C. 742e.

PRODUCT DESCRIPTION AND GRADES

§ 176.1 Product description.

Frozen raw breaded fish portions are clean, wholesome, uniformly shaped unglazed masses of cohering pieces (not ground) of raw fish flesh coated with suitable, wholesome batter and breading. They are packaged and frozen in accordance with good commercial practice and are maintained at temperatures necessary for the preservation of the product. The frozen raw breaded fish portions are at least $\frac{3}{8}$ -inch thick and contain the minimum fish flesh content specified in § 176.21(a). The portions in an individual package are prepared from the flesh of only one species of fish.

§ 176.2 Grades of frozen raw breaded fish portions

(a) "U.S. Grade A" is the quality of frozen raw breaded fish portions that possess good flavor and odor; and for those factors of quality which are rated in accordance with the scoring system outlined in this part the total score is not less than 90 points.

(b) "U.S. Grade B" is the quality of frozen raw breaded fish portions that possess at least reasonably good flavor and odor; and for those factors of quality which are rated in accordance with the scoring system outlined in this part the total score is not less than 70 points.

(c) "Substandard" is the quality of frozen raw breaded fish portions that fail to meet the requirements of U.S. Grade B.

FACTORS OF QUALITY

§ 176.11 Ascertaining the grade.

(a) The grade of frozen raw breaded fish portions is ascertained from the evaluation of a sample unit consisting of ten frozen raw breaded portions selected at random from one or more packages as necessary. The evaluation of the quality factors is made from the examination of the product in the frozen state and after it has been cooked in a suitable manner. The following factors are evaluated in ascertaining the grade of the product: Flavor and odor, appearance, uniformity, absence of defects, and character. These factors are rated in the following manner:

(1) *Flavor and odor.* These factors are rated directly by organoleptic examination. Score points are not assessed (see § 176.12).

(2) *Appearance, uniformity, absence of defects, and character.* The relative importance of these factors is expressed numerically on the scale of 100. The

maximum number of points that may be given each of the factors are:

Factors	Points
Appearance	25
Uniformity	20
Absence of defects	40
Character	15

Total possible score 100

§ 176.12 Evaluation of the unscored factor of flavor and odor.

(a) *Good flavor and odor.* "Good flavor and odor" (essential requirements for a Grade A product) means that the product has good flavor and odor characteristic of the indicated species of fish and of the type of coating used; and is free from staleness, and off-flavors and off-odors of any kind.

(b) *Reasonably good flavor and odor.* "Reasonably good flavor and odor" (minimum requirement of a Grade B product) means that the product may be somewhat lacking in good flavor and odor; and is free from objectionable off-flavors and off-odors of any kind.

§ 176.13 Evaluation and rating of the scored factors: Appearance, uniformity, absence of defects, and character.

The essential variations in quality within each factor which is scored are so described that the value may be ascertained for each factor and expressed numerically. Point deductions are allotted for each degree or amount of variation within each factor. The net score for each factor is the maximum points for that factor less the sum of the deduction-points within the factor. The total score for the product is the sum of the net scores for the four scored factors.

§ 176.14 Appearance.

(a) The factor of appearance refers to the amount of loose breading and frost in the packaged product, and lack of continuity of the coating of the frozen product.

(1) *Loose breading and frost.* "Loose breading" refers to that amount of breading material (crumbs) found free in the package. "Frost" refers to the frozen moisture which is deposited on the product as a white crystalline coating, and which accumulation is objectionable and can be readily removed.

(2) *Continuity.* "Continuity" refers to the coverage of the fish flesh by the coating. Lack of continuity in the frozen state is exemplified by breaks (bare spots, or sections of thin coating through which the fish flesh is slightly visible), ridges (excess breading which projects at the edges of the frozen portion), lumps (objectionable outcropping of the breading on the surface of the frozen portion), and/or depressions (objectionable visible voids or shallow areas in the surface of the portion which are lightly covered by breading). Each $\frac{1}{4}$ -square-inch area of any break, ridge, lump, or depression is considered an instance of "lack of continuity". Individual breaks, ridges, lumps, or depressions measuring less than $\frac{1}{4}$ square inch are not considered.

(b) For the purpose of rating the factor of appearance, the schedule of deduction-points in Table I apply. Frozen

raw breaded fish portions which receive 25 deduction points for the factor of appearance shall not be graded above Substandard regardless of the total score for the product. This is a limiting rule.

TABLE I—SCHEDULE OF POINT-DEDUCTIONS FOR VARIATIONS IN APPEARANCE

Appearance subfactors	Method of determining subfactor score (percent of net weight)		Deduction points
	Over	Not over	
Loose breading and frost.	0	1	0
	1	2	1
	2	3	2
	3	4	3
	4	5	4
Lack of continuity	Number of 1-in. pieces attached		
	Continuity.....		
(a) Slight (8 to 16 instances per portion).	2 or 3	1	1
	4 or 5	2	2
	6 or 7	3	3
	8 to 10	4	4
	2 or 3	5	5
	4 or 5	6	6
	6 or 7	7	7
	8 to 10	8	8
	2 or 3	9	9
	4 or 5	10	10
(b) Moderate (17 to 20 instances per portion).	2 or 3	1	1
	4 or 5	2	2
	6 or 7	3	3
	8 to 10	4	4
(c) Severe (over 20 instances per portion).	2 or 3	1	1
	4 or 5	2	2
	6 or 7	3	3
	8 to 10	4	4

§ 176.15 Uniformity.

(a) The factor of uniformity refers to the degree of conformance of the length, width, and weight of each individual frozen portion to the average length, width, and weight of the portions within a sample unit.

(b) For the purpose of rating the factor of uniformity, the schedule of deduction-points in Table II apply. Frozen raw breaded fish portions which receive 20 deduction-points for the factor of uniformity shall not be graded above Substandard regardless of the total score for the product. This is a limiting rule.

TABLE II—SCHEDULE OF POINT-DEDUCTIONS FOR VARIATIONS IN UNIFORMITY

Method of determining subfactor score	Number of portions affected	Deduction points
<i>Lack of uniformity</i>		
(a) Slight—Portions deviating ± 10.1 to 15 percent from average sample weight, or $\pm \frac{1}{8}$ to $\frac{3}{16}$ inch from average sample length, or $\pm \frac{1}{8}$ to $\frac{3}{16}$ inch from average sample width.	1 2 or 3 4 or 5 6 or 7 8 to 10	0 1 2 3 10
(b) Moderate—Portions deviating ± 15.1 to 20 percent from average sample weight, or more than $\pm \frac{3}{16}$ inch and up to $\frac{1}{2}$ inch from average sample length, or more than $\pm \frac{3}{16}$ inch and up to $\frac{1}{2}$ inch from average sample width.	1 2 or 3 4 or 5 6 or 7 8 to 10	1 2 3 4 10
(c) Severe—Portions deviating over 20 percent of average sample weight, or more than $\pm \frac{1}{2}$ inch from average sample length, or more than $\pm \frac{1}{2}$ inch from average sample width.	1 2 or 3 4 or 5 6 or 7 8 to 10	2 5 9 15 20

§ 176.16 Absence of defects.

(a) The factor of "absence of defects" refers to the degree of freedom from broken portions, damaged portions, lack of adherence, blemishes, and bones. Evaluation of the defects of broken and damaged portions are made on the frozen product. Evaluation of the de-

fects of adherence, blemishes, and bones are made after the product has been cooked in a suitable manner.

(1) *Broken portion*. "Broken portion" means a portion with a break or cut greater than $\frac{1}{2}$ the width or length of the portion.

(2) *Damaged portion*. "Damaged portion" means a portion which has been injured, mashed, or mutilated to the extent that its appearance is materially

TABLE III—SCHEDULE OF POINT-DEDUCTIONS FOR ABSENCE OF DEFECTS

Defect sub-factors	Method of determining subfactor score	Number of portions affected	Deduction points
Broken portions.	Break or cut greater than $\frac{1}{2}$ the width or length of the portion.	0 1 2 3 4 to 10	0 1 2 3 10
Damaged portions.	Degree of damage		
	(a) Slight—Affecting over 5 but less than 25 percent of the surface area of the individual portion.	1 or 2 3 to 5 6 to 10	2 5 10
	(b) Moderate—Affecting over 25 but less than 50 percent of the surface area of the individual portion.	1 or 2 3 to 5 6 to 10	4 10 20
	(c) Severe—Affecting 50 percent or more of the surface area of the individual portion.	1 or 2 3 to 5 6 to 10	8 20 40
Adherence.	Lack of adherence		
	(a) Slight (1 instance per portion).	2 or 3 4 or 5 6 or 7 8 to 10	1 3 5 10
	(b) Moderate (2 or 3 instances per portion).	2 or 3 4 or 5 6 or 7 8 to 10	7 12 18 30
	(c) Severe (4 or more instances per portion).	2 or 3 4 or 5 6 or 7 8 to 10	10 18 30 40
Blemishes.	Number of instances per sample unit (not over 10 instances are recorded per portion)	1 or 2 3 or 4 5 or 6 7 or 8 9 or 10 11 or 12 13 or 14 15 or 16 17 or 18 19 or 20 21	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
Bones.	Number of instances per sample unit	1 2 3 4 5 6 7	1 2 3 4 5 6 7

affected. The amount of damage to a portion is measured by the percentage of the portion affected.

(3) *Adherence*. "Adherence" refers to the adhesion of the coating material (batter and breading) to the fish flesh of the cooked product. Lack of adherence is characterized by a swelling and subsequent bursting of the coating of the cooked product, resulting in exposure of the fish flesh.

Non-adherence is measured by the size of break in the cooked coating. Each $\frac{1}{4}$ square inch break in the coating showing exposed fish flesh is considered an instance of "lack of adherence".

(4) *Blemish*. "Blemish" means a piece of skin, a fin, a blood spot, a bruise, an excessively dark fat layer, curd spot, scales, or extraneous material. One "instance of skin" means one or more pieces of skin covering an accumulative area up to 1 square inch; except that individual skin pieces less than $\frac{1}{4}$ square inch in area are not considered. One "instance of fin" means one identifiable fin or parts of any fin covering an aggregate area up to $\frac{1}{2}$ square inch; except that any fin over $\frac{1}{2}$ square inch in area is considered as 2 instances. One "instance of curd" means one curd spot or a group of curd spots covering an aggregate area up to one square inch; except that no individual curd spot less than $\frac{1}{4}$ square inch in area is considered. One "instance of scales" means one scale or group of scales covering an aggregate area up to $\frac{1}{2}$ square inch. One "blood spot", "bruise", or "excessively dark fat layer" (which is yellow, rusting, or extremely dark for the species of fish used) means a blood spot, bruise, or excessively dark fat layer which measures at least $\frac{1}{4}$ square inch in area and which is objectionable.

(5) *Bones*. One "instance of bones" means one bone or part of any bone or one group of bones occupying or contacting a circular area up to 1 square inch.

(b) For the purpose of rating the factor of "absence of defects", the schedule of deduction-points in Table III apply.

§ 176.17 Character.

(a) The factor of character refers to the ease of separation of the portions, and the texture of the fish flesh and of the coating.

(1) *Ease of separation*. "Ease of separation" refers to the difficulty of separating one frozen portion from the other.

(2) *Texture*. "Texture" refers to the firmness, tenderness, and moistness of the cooked fish flesh, and to the crispness and tenderness of the coating of the cooked product. The texture of the cooked fish flesh may be classified as a degree of mushiness, tenderness, toughness, or fibrousness. The texture of the coating in the cooked state may be classified as a degree of pastiness, toughness, dryness, or mushiness.

(b) For the purpose of rating the factor of character, the schedule of deduction-points in Table IV apply. Frozen raw breaded fish portions which receive 15 deduction points for the factor of character shall not be graded above Substandard regardless of the total score for the product. This is a limiting rule.

DEFINITIONS AND METHODS OF ANALYSIS

§ 176.21 Definitions and methods of analysis.

(a) *Minimum fish flesh content*.

"Minimum fish flesh content" refers to the minimum percent, by weight, of fish flesh allowed for portions of various surface areas as specified in Table V.

The minimum fish flesh content for frozen raw breaded fish portions is determined by the following method:

(i) *Equipment and material*. (1) Water bath (3 to 4 liter beaker).

(ii) Balance accurate to 0.1 gram.

TABLE IV—SCHEDULE OF POINT-DEDUCTIONS FOR VARIATIONS IN CHARACTER

Character subfactors	Method of determining subfactor score	Deduction points	
	Degree of ease of separation	Number of portions affected	
Ease of separation.	(a) Slight—Portions separated by hand with slight effort.	1 to 10.....	0
	(b) Moderate—Portions separated by hand with difficulty.	1 or 2..... 3 or 4..... 5 or 6..... 7 to 10.....	1 2 3 5
	(c) Severe—Portions separated only by use of knife or other instrument.	1 or 2..... 3 or 4..... 5 or 6..... 7 to 10.....	2 4 6 10
Texture.....	Texture of coating is—		
	(a) Firm or crisp, but not tough, pasty, or mushy.		0
	(b) Slightly tough, pasty, or mushy.		1
	(c) Moderately tough, pasty, or mushy.		5
	(d) Excessively tough, pasty, or mushy.		10
	Texture of fish flesh is—		
	(a) Firm, slightly resilient but not tough or rubbery; moist but not mushy.		0
	(b) Moderately firm, only slightly tough or rubbery; does not form a fibrous mass in the mouth; moist but not mushy.		1
	(c) Moderately tough or rubbery; has noticeable tendency to form a fibrous mass in the mouth; or is dry; or is mushy.		5
	(d) Excessively tough or rubbery; has marked tendency to form a fibrous mass in the mouth; or is very dry; or is very mushy.		15

TABLE V—MINIMUM FISH FLESH CONTENT ESTABLISHED FOR FROZEN RAW BREADED FISH PORTIONS

Surface area of portions (square inches)		Minimum fish flesh content
Over—	Up to—	
0.....	15	Percent by weight
15.....	21	72
21.....		75
		78

(iii) Clip tongs of wire, plastic, or glass.

(iv) Stop-watch or regular watch with second hand.

(v) Paper towels.

(vi) Spatula, 4-inch blade with rounded tip.

(vii) Nut picker.

(viii) Thermometer (immersion type) accurate to $\pm 2^\circ\text{F}$.

(ix) Copper sulfate crystals (500 grams).

(2) *Procedure*. (1) Obtain the weight of each portion in the sample while it is still in a hard frozen condition.

(ii) Place each portion individually in the water bath maintained at 63° to 86°F , and allow to remain until such

NOTE: Several dry runs are necessary to determine the exact dip time required for "de-breading" the portions in a hot sample. For dry runs only, a saturated solution of copper sulfate (500 grams of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ in 2 liters of tap water) is necessary. The correct dip time is the minimum time required to dip the portions in the (copper sulfate) solution so that the breading can easily be scraped off; provided that (1) the "de-breaded" portion is still solidly frozen, and (2) only a slight trace of blue color is visible on the surface of the "de-breaded" fish portion.

time as the breeding becomes soft and can easily be removed from the still frozen fish flesh (between 10 to 80 seconds for portions held in storage at 0° F.).

(iii) Remove the portion from the bath; blot lightly with double thickness paper toweling; and scrape off or pick out coating from the fish flesh with the spatula or nut picker.

(iv) Weigh the "debreaded" fish flesh of the portion.

(v) Calculate the percent of fish flesh in the sample by the following formula:

$$\text{Percent fish flesh} = \frac{\text{Weight of fish flesh (iv)}}{\text{Weight of raw breaded fish portion (i)} \times (100)}$$

(b) *Loose breeding and frost.* "Loose breeding and frost" refers to the percent, by weight, of "loose crumbs and frost" found in the sample package(s). "Loose breeding and frost" is determined by use of a balance (accurate to 0.1 gram) in accordance with the following method:

(i) *Procedure.* (i) Remove the overwrap.

(ii) Weigh carton(s) and all contents.

(iii) Remove breaded fish portions.

(iv) Weigh carton(s) less breaded portions, but including crumbs, frost, and separators (if used).

(v) Remove crumbs and frost from the package(s).

(vi) Weigh cleaned carton(s) and separators.

(vii) Calculate percent loose breeding and frost:

Percent loose breeding and frost =

$$\frac{\left(\begin{array}{l} \text{Weight carton(s) less breaded portions, but} \\ \text{including crumbs, frost, and separators (iv)} \end{array} \right) - \left(\begin{array}{l} \text{Weight cleaned carton(s)} \\ \text{and separators (vi)} \end{array} \right)}{\text{Weight of carton(s) and all contents (ii)}} \times 100$$

(c) *Cooking in a suitable manner.* "Cooking in a suitable manner" means cooking in accordance with the frying instructions accompanying the product. However, if specific instructions for frying are lacking, the product for inspection is cooked as follows:

(i) *Equipment and material.* (i) Deep fat fryer (thermostatically controlled).

(ii) Wire mesh deep fry basket.

(iii) Sufficient fat to cover portions.

(iv) Paper towels.

(2) *Procedure.* (i) While still in the frozen state, place the sample to be cooked in a wire-mesh deep-fry basket sufficiently large to hold the portions in a single layer without touching each other.

(ii) Lower basket and its contents into suitable liquid oil or hydrogenated oil heated to 350-375 degrees Fahrenheit. Maintain these temperatures throughout the cooking operation. Fry for three to five minutes, or until the portions attain a pleasing golden brown color.

(iii) Remove basket from oil and allow to drain for fifteen seconds. Place the cooked portions on a paper napkin or towel to absorb excess oil.

LOT CERTIFICATION TOLERANCES

§ 176.25 Tolerances for certification of officially drawn samples.

The sample rate and grades of specific lots shall be certified in accordance with Part 170 of this chapter (Regulations Governing Processed Fishery Products, 23 F.R. 5064, July 3, 1958).

SCORE SHEET

§ 176.31 Score sheet for frozen raw breaded fish portions.

Factor	Maximum score points	Deduction points
Label: Size and kind of container
Container mark or identification
Size of lot
Number of packages for each certification
Size of sample
Type of container (clay, glass, plastic)
Actual net weight

Factor	Maximum score points	Deduction points
Appearance
Uniformity
Absence of defects
Chute loss
Total
Flavor and odor
Final grade

PRODUCT DESCRIPTION AND GRADES

Sec. 177.1 Product description.
177.2 Grades of frozen cod filets.

WEIGHTS AND DIMENSIONS
177.6 Recommended weights and dimensions.

FACTORS OF QUALITY
177.11 Ascertaining the grade.
177.12 Evaluation of the unscored factor of flavor and odor.
177.13 Evaluation and rating of the scored factors: Appearance, size, absence of defects, and character.

177.14 Appearance.
177.15 Size.
177.16 Absence of defects.
177.17 Character.

DEFINITIONS AND METHODS OF ANALYSIS
177.21 Definitions and methods of analysis.

LOT CERTIFICATION TOLERANCES
177.25 Tolerances for certification of officially drawn samples.

SCORE SHEET
177.31 Score sheet for frozen cod filets.

AUTHORITY: §§ 177.1 to 177.31 issued under sec. 6(a), Fish and Wildlife Act of August 8, 1956; 16 U.S.C. 742e.

PRODUCT DESCRIPTION AND GRADES
§ 177.1 Product description.

The product described in this part consists of clean, whole, wholesome filets or primarily large pieces of clean, whole, wholesome filets, cut away from either side of cod, *Gadus morhua* or *Gadus macrocephalus*; the filets may be either skinned or with skin on. They are packaged and frozen in accordance with good commercial practice and are maintained at temperatures necessary for the preservation of the product. (This part does not provide for the grading of pieces of fish flesh cut away from previously frozen fish blocks, slabs, or similar products.)

§ 177.2 Grades of frozen cod filets.

(a) "U.S. Grade A" is the quality of frozen cod filets that possess good flavor and odor; and for those factors of quality which are rated in accordance with the scoring system outlined in this part the total score is not less than 85 points.

(b) "U.S. Grade B" is the quality of frozen cod filets that possess at least reasonably good flavor and odor; and for those factors of quality which are rated in accordance with the scoring system outlined in this part the total score is not less than 70 points.

(c) "Substandard" is the quality of frozen cod filets that fail to meet the requirements of U.S. Grade B.

WEIGHTS AND DIMENSIONS
§ 177.6 Recommended weights and dimensions.

(a) The recommendations as to net weights and dimensions of packaged frozen cod filets are not incorporated in the grades of the finished product since net weights and dimensions, as such, are not factors of quality for the purpose of these grades.

PART 177—UNITED STATES STANDARDS FOR GRADES OF FROZEN COD FILETS¹

On page 9399 of the FEDERAL REGISTER of November 21, 1959, there was published a notice and text of a proposed new part 177 of Title 50, Code of Federal Regulations. The purpose of the new part is to issue United States Standards for Grades of Frozen Cod Filets under the authority transferred to the Department of the Interior by section 6(a) of the Fish and Wildlife Act of August 8, 1956 (16 U.S.C. 742e).

Interested persons were given until December 18, 1959, to submit written comments, suggestions or objections with respect to the proposed new part. No comments, suggestions or objections have been received, and the proposed new part is hereby adopted without change and is set forth below. This amendment shall become effective at the beginning of the 30th calendar day following the date of this publication in the FEDERAL REGISTER.

Dated: February 23, 1960.

ELMER F. BENNETT,
Acting Secretary of the Interior.

¹ Compliance with the provisions of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act.

(b) It is recommended that the net weights of the packaged frozen cod fillets be not less than 12 ounces and not over 10 pounds.

FACTORS OF QUALITY

§ 177.11 Ascertaining the grade.

The grade of frozen cod fillets is ascertained by examining the product in the frozen, thawed, and cooked states. The following factors of quality are evaluated in ascertaining the grade of the product: Flavor and odor, appearance, size, absence of defects, and character. These factors are rated in the following manner:

(1) *Flavor and odor.* This factor is rated directly by organoleptic evaluation. Score points are not assessed (see § 177.12).

(2) *Appearance, size, absence of defects, and character.* The relative importance of these factors is expressed numerically on the scale of 100. The maximum number of points that may be given each of these factors are:

Factors	Points
Appearance.....	25
Size.....	20
Absence of defects.....	20
Character.....	15
Total possible score.....	100

§ 177.12 Evaluation of the unscored factor of flavor and odor.

(a) *Good flavor and odor.* "Good flavor and odor" (essential requirement for a Grade A product) means that the fish flesh has good flavor and odor characteristic of cod (*Gadus morhua* or *Gadus macrocephalus*) and is free from staleness, and off-flavors and off-odors of any kind.

(b) *Reasonably good flavor and odor.* "Reasonably good flavor and odor" (minimum requirement of a Grade B product) means that the fish flesh may be somewhat lacking in good flavor and odor; and is free from objectionable off-flavors and off-odors of any kind.

§ 177.13 Evaluation and rating of the scored factors: appearance, size, absence of defects, and character.

The essential variations in quality within each factor which is scored are so described that the value may be ascertained for each factor and expressed numerically. Point deductions are allotted for each degree or amount of variation within each factor. The net score for each factor is the maximum points for that factor less the sum of the deduction-points within the factor. The total score for the product is the sum of the net scores for the four scored factors.

§ 177.14 Appearance.

(a) The factor of appearance refers to the normal color of the species of frozen fish flesh, and to the degree and amount of surface dehydration of the frozen product.

(b) For the purpose of rating the factor of appearance the schedule of deduction-points in Tables I and II apply. Frozen cod fillets which receive 25 deduction points for the factor of appearance shall not be graded above Substandard regardless of the total score for the product. This is a limiting rule.

TABLE I—SCORE DEDUCTIONS FOR DISCOLORATION

Color of frozen product	Deduction points	
	"Light" colored portion comprising main portion of fillet	"Dark" colored portion occurring under skin mainly along lateral line
No discoloration.....	0	0
Slight yellowing.....	2	1
Moderate yellowing.....	4	2
Excessive yellowing and/or any rusting.....	13	12

TABLE II—SCORE DEDUCTIONS FOR DEHYDRATION

Degree of dehydration of frozen product	Surface area affected (percent)		Deduction points
	Over—	Not over—	
Slight—Shallow and not color masking.....	0	1	0
	1	50	2
	50	100	5
Moderate—Deep but just deep enough to easily scrape off with fingernail.....	1	25	5
	25	50	8
	50	100	10
Excessive—Deep dehydration not easily scraped off.....	1	25	12
	25	100	25

§ 177.15 Size.

(a) The factor of size refers to the degree of freedom from undesirably small fillet pieces. Any fillet piece weighing less than 2 ounces is classed as being undesirably small.

(b) For the purpose of rating the factor of size the schedule of deduction-points in Table III apply. Cod fillets which receive 20 deduction points for this factor shall not be graded above Substandard regardless of the total score for the product. This is a limiting rule.

TABLE III—SCORE DEDUCTIONS FOR SIZE OF FILLET PIECES

Number of fillet pieces less than 2 ounces per pound		Deduction points
Over—	Not over—	
0.....	0.....	0
1.....	1.....	1
2.....	2.....	10
3.....	3.....	15
4.....	4.....	20

§ 177.16. Absence of defects.

(a) The factor of "absence of defects" refers to the degree of freedom from improper packing, cutting and trimming imperfections, blemishes, and bones. Evaluation for the defect of improper packing is made on the frozen product. Evaluation of the defects of cutting and trimming, blemishes, and bones are made on the thawed product.

(1) *Improper packing.* "Improper packing" means poor arrangement of fillets, presence of voids, depressions, frost, and the imbedding of packaging material into the frozen fish flesh.

(2) *Cutting and trimming imperfections.* "Cutting and trimming imperfections" means that the thawed fillets have ragged edges, tears, holes, or are otherwise improperly cut or trimmed.

(3) *Blemish.* "Blemish" means an instance of skin (except for skin-on

fillets), scales, blood-spot, bruise, black-belly lining, fin, or extraneous material. One "instance of skin" consists of one piece of skin not less than $\frac{1}{2}$ square inch and not more than $\frac{1}{2}$ square inches in area; each additional $\frac{1}{2}$ square inch area of individual skin pieces greater than $\frac{1}{2}$ square inches is considered as an additional instance. One "instance of blood spot" is one of such size and prominence as to be considered objectionable. One "instance of black-belly lining" is any piece of black-belly lining not less than $\frac{1}{2}$ inch and not more than 1 inch in length; each additional $\frac{1}{2}$ inch length of individual pieces of black-belly lining longer than 1 inch is considered as an instance. Each aggregate area of identifiable fin or parts of any fin up to 1 square inch is considered as one "instance of fin". Each aggregate area up to 1 square inch per fillet of one scale or group of scales is considered as one "instance of scales". An "instance of bruise" consists of a bruise not less than $\frac{1}{2}$ square inch and not more than $\frac{1}{2}$ square inches in area; each bruise larger than $\frac{1}{2}$ square inches is considered as two instances of bruise.

(4) *Bones.* One "instance of bone" means one bone or one group of bones occupying or contacting a circular area up to 1 square inch.

(b) For the purpose of rating the factor of "absence of defects" the schedule of deduction-points in Table IV apply.

TABLE IV—SCORE DEDUCTIONS FOR ABSENCE OF DEFECTS

Defects subfactors	Method of determining subfactor score	Deduction points
Improper packing.....	Moderate defects, noticeably affecting the product's appearance.....	2
	Excessive defects, seriously affecting product's appearance.....	4
Blemishes.....	Number of blemishes per 1 lb. of fish flesh: Over 0 not over 1.....	1
	Over 1 not over 2.....	3
	Over 2 not over 3.....	5
	Over 3 not over 4.....	8
	Over 4 not over 5.....	12
	Over 5 not over 6.....	15
	Over 6 not over 7.....	30
	Over 7.....	40
Bones.....	Number of instances per 1 lb. of fish flesh: Over 0 not over 1.....	0
	Over 1 not over 2.....	2
	Over 2 not over 3.....	4
	Over 3 not over 4.....	6
	Over 4 not over 5.....	8
	Over 5 not over 6.....	14
	Over 6 not over 7.....	30
	Over 7.....	40
Cutting and trimming.....	Slight defects, scarcely noticeable.....	0
	Moderate defects, noticeable but not affecting the usability of any fillets.....	4
	Excessive defects impairing: (a) the usability of up to $\frac{1}{4}$ of the total number of fillets.....	8
	(b) the usability of over $\frac{1}{4}$ but not more than $\frac{1}{2}$ of the total number of fillets.....	16
	(c) the usability of over $\frac{1}{2}$ of the total number of fillets.....	40

§ 177.17 Character.

(a) The factor of character refers to the amount of free drip in the thawed fillets, and to the tenderness and moistness of the cooked fish flesh.

(b) For the purpose of rating the factor of character the schedule of deduction-points in Table V apply. Cod fillets which receive 15 deduction-points

for the factor of character shall not be graded above Substandard regardless of the total score for the product. This is a limiting rule.

TABLE V—SCORE DEDUCTIONS FOR CHARACTER

Character subfactors	Method of determining sub-factor score	Deduction points
Texture.....	Texture of the cooked fish: (a) Firm, slightly resilient but not tough or rubbery; moist but not mushy. (b) Moderately firm; only slightly tough or rubbery; does not form a fibrous mass in the mouth; moist but not mushy. (c) Moderately tough or rubbery; has noticeable tendency to form a fibrous mass in the mouth; or is dry; or is mushy. (d) Excessively tough or rubbery; has marked tendency to form a fibrous mass in the mouth; or is very dry; or is very mushy.	0 1 4 8 15
Drip.....	Percent of drip: Over 0 not over 5..... Over 5 not over 6..... Over 6 not over 8..... Over 8 not over 10..... Over 10 not over 12..... Over 12 not over 14..... Over 14 not over 16..... Over 16.....	0 1 2 4 6 9 12 15

DEFINITIONS AND METHODS OF ANALYSIS

§ 177.21 Definitions and methods of analysis.

(a) *Percent of drip.* "Percent of drip" means the percent by weight of "free drip" (the fluid which is not absorbed by the fish tissue when the frozen fish thaws, and which separates freely without the aid of any external forces except gravity) in an individual package as determined by the following method:

- (i) *Apparatus and materials.* (1) Water bath.
- (ii) Balance, accurate to 0.1 gm; or 0.01 ounce.
- (iii) Pliable and impermeable bag (cryovac, ploidim, etc.).
- (iv) Corrosion resistant metal rod weight (preferably stainless steel or

monel metal), measuring $3\frac{1}{2}$ inches in length and approximately $\frac{1}{4}$ – $\frac{1}{2}$ inch in diameter.

- (v) U.S. Standard No. 8 mesh circular sieve (both 8 and 12 inch diameters).
- (vi) Stirring motor.
- (vii) Identification tags.

(2) *Procedure.* (i) Place metal rod weight into an empty pliable bag.

- (ii) Weigh the bag and the metal weight.

(iii) Remove the frozen fish material from the container (container consists of the carton and the inner and outer wrappings).

(iv) Place the frozen product, plus scraps of any material remaining in the container, into the pliable bag.

- (v) Weigh the bag and its contents and subtract tare (empty bag and metal weight) to determine the net weight of the product.

(vi) Suspend the bag and contents in an agitated water bath maintained at 68° F. plus or minus 2° F. The bag should be suspended in the water so that the fish flesh is below the water line.

(vii) Allow the bag and its contents to remain immersed until the product is defrosted (a "test run", in advance, is necessary to determine time required for each product and quantity of product).¹

- (viii) Remove bag and contents from bath and gently dry outside of bag.
- (ix) Weigh dry U.S. Standard No. 8 mesh circular sieve.

(x) Open bag and empty contents onto U.S. Standard No. 8 circular sieve so as to distribute the product evenly, inclining the sieve slightly to facilitate drainage, and allowing to drain for two minutes.

- (xi) Weigh sieve and its contents and

¹ The purpose of the "test run" is to determine the time necessary to thaw the product. The complete thawing of the product is determined by frequent but gentle squeezing of the bag until no hard core or ice crystals are felt. This package which has been squeezed can not be used for drained weight calculations.

calculate drained weight. The drained weight is the weight of sieve and fillets less the weight of the dry sieve.

- (xii) Calculate percent drip:

$$\text{Net weight (v)} - \text{drained weight (xi)} \times 100 \\ \text{Net weight (v)} = \text{Percent of drip.}$$

(b) *Cooking in a suitable manner.*

"Cooking in a suitable manner" shall mean that the product is cooked as follows: Place the thawed unseasoned product into a boilable film-type pouch; fold the open end of the pouch over the suspension bar and clamp in place to provide a loose seal. Immerse the pouch and its contents in boiling water and cook until the internal temperature of the fillets reaches 160° F. (about 20 minutes).

LOT CERTIFICATION TOLERANCES

§ 177.25 Tolerances for certification of officially drawn samples.

The sample rate and grades of specific lots shall be certified in accordance with Part 170 of this chapter (Regulations Governing Processed Fishery Products, 23 F.R. 5064, July 3, 1958).

§ 177.31 Score sheet for frozen cod fillets.

SCORE SHEET	
Label:	.....
Size and kind of container:	.....
Container mark or identification:	.....
Size of lot:	.....
Number of packages per master carton:	.....
Size of sample:	.....
Type of overwrap:	.....
Actual net weight:	(lb.) (kg.)

Factor	Score points	Sample score
Appearance.....	25	.....
Size.....	20	.....
Absence of defects.....	40	.....
Character.....	15	.....
Total.....	100	.....
Flavor and Odor.....	.....	.....
Final Grade.....	.....	.....

Note: Also see *Commercial Fisheries Review*, February 1960, p. 101; January 1960, p. 94.

FROZEN SALMON STEAKS VOLUNTARY GRADE STANDARDS PROPOSED:

Frozen salmon steaks voluntary grade standards are proposed by the U. S. Bureau of Commercial Fisheries. The regulations are proposed for adoption in accordance with the authority contained in Title II of the Agricultural Marketing Act of August 14, 1946, as amended. Functions under that Act pertaining to fish, shellfish, and any products thereof were transferred to the Department of the Interior by section 6(a) of the Fish and Wildlife Act of August 8, 1956.

The proposed standards, if recommended to the Secretary of the Interior for adoption and made effective, will be the first issued by the Department prescribing voluntary grade standards for frozen salmon steaks.

The proposed standards include product description, styles and grades, factors of quality and grade, including ascertaining the grade; definitions; lot certification tolerances; and score sheets.

The frozen salmon steaks are described as clean, wholesome units of frozen raw fish meat with normally associated skin and bone and are 2.5 ozs. or more in weight. Each steak has two parallel surfaces and is derived from whole or subdivided salmon slices of uniform thickness which result from sawing or cutting dressed salmon perpendicularly to the axial length, or backbone. Steaks are prepared from either frozen or unfrozen salmon (*Oncorhynchus* sp.) and are processed, frozen, and packaged. The species of salmon covered are silver or coho; chum or keta; king, chinook or spring; red or sockeye; and pink.



Tariff Commission

SHRIMP INVESTIGATION ANNOUNCED:

In response to a resolution of the Committee on Ways and Means of the House of Representatives, adopted February 9, 1960, the U. S. Tariff Commission has instituted an investigation with regard to shrimp under the authority of section 332 of the Tariff Act of 1930 (19 U.S.C. 1332).

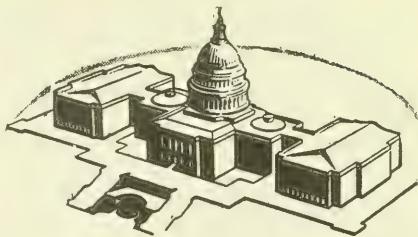
The resolution directs the Commission, pursuant to section 332 of the Tariff Act of 1930, "to make an investigation to determine whether shrimp, as a result of the existing customs treatment thereof as provided for by paragraph 1761 of such Act, are being imported into the United States in such increased quantities, either actual or relative to domestic production, as to cause or threaten serious injury to the domestic shrimp industry, and to report the results of such investigation to the Committee on Ways and Means of the House of Representatives not later than three months after the date of the adoption of this resolution. If such determination is in the affirmative the Commission shall specify in its report the rate or rates of duty (not in excess of 50 per centum ad valorem) which it determines to be necessary to remedy or prevent such serious injury. In the course of its investigation the Commission shall hold a hearing at which interested parties shall be given reasonable opportunity to be present and be heard; and in making its determinations under this resolution the Commission shall take into consideration the factors set forth in section 7(b) of the Trade Agreements Extension Act of 1951."

A public hearing was held on March 16, 1960, in Washington, D. C.



Eighty-Sixth Congress (Second Session)

Public bills and resolutions which may directly or indirectly affect fisheries and allied industries are reported. Introduction, referral to Committees,



pertinent legislative actions, hearings, and other actions by the House and Senate, as well as signature into law or other final disposition are covered.

ALASKA FISHERIES REHABILITATION: The Alaska State Legislature submitted its House Joint Memorial 33 to the United States Senate on February 23, 1960. The memorial urged that the State of Alaska be provided funds by Congress in the amount of \$30 million over a period of 15 years to rehabilitate the fisheries of the State of Alaska through a program embracing research, development, conservation, and processing aspects of fishing.

COLOR ADDITIVES IN FOOD: The House Committee on Interstate and Foreign Commerce heard testimony on March 11, 1960, of representatives of the Department of Agriculture with respect to color additives legislation (H. R. 7624 and S. 2197).

FISHERIES ASSISTANCE ACT: In a joint committee meeting, conferees in executive session agreed to file a conference report on the differences between the Senate- and House-passed versions of H. R. 5421 (MacDonald), to provide a program of assistance in the construction of fishing vessels. On March 1, 1960, the Senate and House conferees agreed to the bill, in principle, but a compromise on the amount of money involved was made. The House bill provided \$1,000,000 per annum while the Senate bill provided \$5,000,000 per annum. A compromise was reached on a figure of \$2,500,000 per annum for three years. The House provision limiting assistance to those fisheries denied relief under "escape clause" action was modified somewhat, making certain vessel owners eligible for assistance where no duties are involved and therefore not subject to the jurisdiction of the Tariff Commission.

FISHERY LEGISLATION: Fishery and Wildlife Legislation (Hearings, August 4, 5, and 6, 1959, before the Merchant Marine and Fisheries Subcommittee of the Committee on Interstate and Foreign Commerce, United States Senate, 86th Congress, 1st Session, on S. 1262, S. 1374, S. 1391, S. 1575, S. 1576, S. 1781, S. 2053, S. 2338, S. 2342, S. 2481, S. 2578, H. R. 5854, and H. R. 2398, bills pertaining to fishery and wildlife legislation), 280 pp., printed. Contains texts of the several legislative bills; testimony presented by Government and private industry representatives; and various reports and statements submitted for the record. Hearings on S. 2338 (a bill to

provide a program to correct inequities in the construction of fishing vessels and to enable the fishing industry of the United States to regain a favorable and competitive status, and for other purposes) include portions of the tuna fish industry hearings held in Los Angeles, Calif., before Senator Engle on June 1, 1959; testimony of several representatives of the United States tuna industry; and testimony of the Director of the Bureau of Commercial Fisheries concerning problems of the tuna industry in southern California.

FISHERY EXTENSION SERVICE: H. R. 10846 (Coffin of Maine) and H. R. 10864 (Oliver of Maine). Identical bills to authorize the Secretary of the Interior to establish a fishery extension service in the Fish and Wildlife Service of the Department of the Interior for the purposes of carrying out cooperative fishery extension work with the States, territories, and possessions; to the Committee on Merchant Marine and Fisheries; introduced in House March 2, 1960.

HAWAII OMNIBUS ACT: S. 3054 (Murray et al), a bill to amend certain laws of the United States in light of the admission of the State of Hawaii into the Union, and for other purposes; to the Committee on Interior and Insular Affairs; introduced in Senate February 17, 1960. The bill is designated to make changes in Federal laws which have become necessary and desirable because of the change in Hawaii's status from Territory to a State. Section 13 of the bill contains perfecting amendments to the statute which authorizes the Secretary of Interior to undertake exploration, investigation, development, and maintenance projects for fishery resources in the Pacific, by deleting inappropriate references to "Territory" and "Hawaiian Islands."

HYDROFOIL VESSEL: S. 3126 (Bartlett), a bill to authorize the construction of an ocean-going hydrofoil vessel in order to demonstrate the commercial application of hydrofoil seacraft; to the committee on Interstate and Foreign Commerce; introduced in Senate March 1, 1960.

INTERIOR APPROPRIATIONS: The House on February 16, 1960, passed by a voice vote H. R. 10401 (Kirwan), a bill making appropriations for the Department of Interior and related agencies for fiscal year 1961, and for other purposes. Included in the bill is an increase of \$4,090,800 for the Fish and Wildlife Service, primarily to replace permanent appropriations from receipts, including duck stamp funds, which will no longer be available for operations, enforcement, or research.

Senator Kuchel on the floor of the Senate on March 2, 1960, made a statement urging the incorporation in the 1961 Interior appropriation bill of \$400,000 for studies of oceanography and biology of tunas. The appropriation bill is in the Senate Appropriations Committee.

LAW OF THE SEA: The State of Alaska Senate in its Senate Memorial 9 submitted to the United States Senate on February 22, 1960, urged that the Senate of the United States advise and consent to ratification of four conventions and a protocol formulated at the United Nations Conference on Law of the Sea, held at Geneva February 24 to April 27, 1958. In the case of the Convention on Fishing and Conservation of the Living Resources of the High Seas, ratification was urged to the pro-

posed understanding as regards the conservation procedure known as "abstention."

OCEANOGRAPHIC SURVEYS: H. R. 10546 (Oliver), a bill to establish a public policy with respect to oceanographic surveys, and to provide for coordination of the efforts of Federal agencies with respect to oceanographic surveys; to the Committee on Merchant Marine and Fisheries; introduced in House February 18, 1960. Identical to H. R. 10412 (G. P. Miller), introduced February 15, 1960; and H. R. 10581 (Pelly), introduced in House February 22, 1960.

Representative Oliver, a member of the special Subcommittee on Oceanography of the House Merchant Marine and Fisheries Committee, introduced into the Congressional Record of February 18, 1960, his recommendations in favor of H. R. 10412 (G. P. Miller) and his own bill, H. R. 10546. His report discusses the need for more oceanographic research, especially in view of Russian advances in that field. The article covers Soviet oceanic expansion, fishing in distant waters, and interest in world oceans. Representative Oliver recommends an increase of \$18 million in the 1961 fiscal year budget over the \$37.7 million fiscal year 1960 appropriations for all oceanographic activities by the Federal Government.

PUBLIC HEALTH SERVICE CARE FOR FISHING VESSEL OWNERS: H. R. 9926 (Mr. Clem Miller), a bill to amend section 322 of the Public Health Service Act to permit certain owners of fishing vessels to receive medical care and hospitalization without charge at hospitals of the Public Health Service; referred to the Committee on Interstate and Foreign Commerce; introduced in House January 26, 1960. The amendment would provide Public Health Service care to persons who own vessels registered, enrolled, or licensed under the maritime laws of the United States, who are engaged in commercial fishing operations, and who accompany such vessels on such fishing operations and a substantial part of whose services in connection with such fishing operations are comparable to services performed by seamen employed on such vessels or on vessels engaged in similar operations.

SALMON FISHING IN NORTH PACIFIC: On February 27, 1960, the Legislature of the State of Alaska, in its House Joint Memorial 32 to the United States Senate, urged that the Congress and the executive branch proceed with deliberate speed to provide for immediate stoppage of all salmon fishing by nets on the high seas of the North Pacific and Bering Sea.

SECOND SUPPLEMENTAL APPROPRIATIONS: H. R. 10743 (Thomas), a bill making supplemental appropriations for the fiscal year ending June 30, 1960, and for other purposes; introduced February 26, 1960 (H. Rept. 1292); to the Committee of the Whole House on the State of the Union. Includes for the Fish and Wildlife Service, Bureau of Commercial Fisheries, an increase of \$55,000 to modify and improve docking facilities at the technological laboratory, Pascagoula, Miss.

Second Supplemental Appropriation Bill, 1960 (Hearings before the Subcommittee of the Committee on Appropriations, House of Representatives, 86th Congress, 2nd Session) 395 pp., printed. In-

cludes statement of purpose and need for supplemental funds of \$55,000 for the Bureau of Commercial Fisheries to modify and improve docking facilities of the technological laboratory, Pascagoula, Miss.

SHRIMP IMPORT DUTIES: H. R. 10608 (Rivers of Alaska), a bill to amend the Tariff Act of 1930 to provide for the establishment of country-by-country quotas for the importation of shrimp and shrimp products, to impose a duty on all unprocessed shrimp imported in excess of the applicable quota, and to impose duty on processed shrimp and prohibit its importation in excess of the applicable quota; to the Committee on Ways and Means; Introduced in House February 23, 1960. Identical to several bills introduced during the first session of the 86th Congress.

Similar to H. R. 10961 (Herlong), a bill to amend the Tariff Act of 1930 to provide for the establishment of country-by-country quotas for the importation of shrimp and shrimp products, to impose a duty on all shrimp imported in excess of the applicable quota; to the Committee on Ways and Means; Introduced in House March 8, 1960. Similar in purpose to about 29 bills introduced during the first and second sessions of the 86th Congress. H. R. 10961 omits part of the language of H. R. 8769 (Herlong) which was introduced on August 24, 1959, during the first session of the 86th Congress. The major change in this new version is that quantities up to the amount of the quota on both un-

processed and processed shrimp will enter duty free. Everything above quota, for both unprocessed and processed would be dutiable at 50 percent. The old bill would have allowed all unprocessed shrimp up to the quota to be duty-free; over quota, 50 percent. All processed shrimp up to the quota would have been dutiable at 25 percent, and none would have been allowed over quota.

TARIFF NEGOTIATIONS: H. Con. Res. 592 (Knox), concurrent resolution expressing the sense of Congress that the United States should not grant further tariff reductions in the forthcoming tariff negotiations under the provisions of the Trade Agreements Extension Act of 1958, and for other purposes; Identical to H. Con. Res. 593 (Gray); both referred to the Committee on Ways and Means; Introduced in House February 17, 1960. Also identical to H. Con. Res. 594 (Flynt), introduced February 22, 1960; H. Con. Res. 610 (Bray), introduced March 7, 1960; and 19 other concurrent resolutions previously reported.

TRANSPORTATION: S. 3048 (Magnuson), a bill to amend the Interstate Commerce Act with respect to reasonable differentials in favor of joint rates for through transportation by rail and water, and for other purposes; to the Committee on Interstate and Foreign Commerce; introduced in Senate February 16, 1960.



HERRING SPAWN DRIFT STUDIED

Studies by the U. S. Bureau of Commercial Fisheries of the non-tidal circulation in the Gulf of Maine-Georges Bank area and its effect upon the distribution and survival of larval herring are being made. Indications are that an intrusion of warm Slope and Gulf Stream water over the southern part of Georges Bank in the fall of the year occurs more frequently than previously expected. Drift bottle and transponding radio buoy studies indicate that the surface waters in the area of herring spawning on Georges Bank move in a southwesterly direction and that herring larvae in these surface waters would be carried off the southern edge of the bank into the slope water zone and lost to the fishery.

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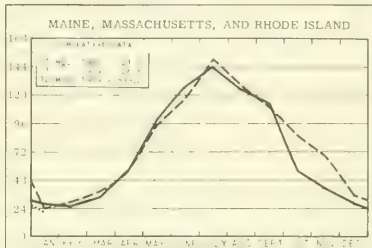
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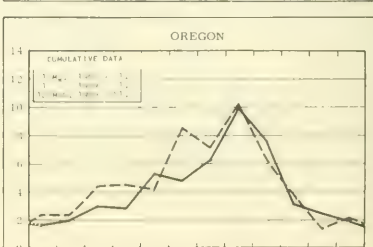
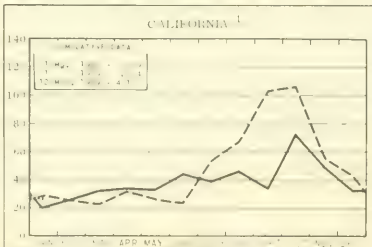
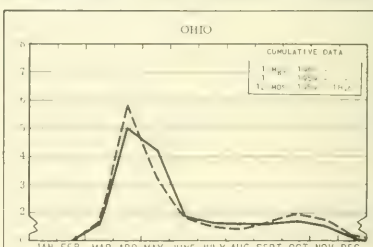
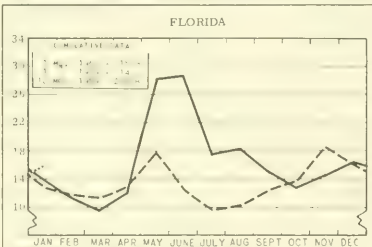
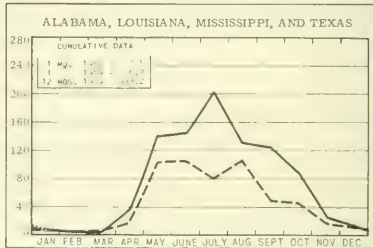
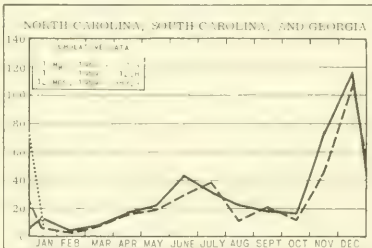
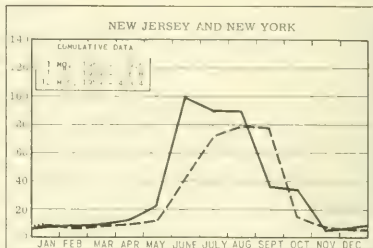
FISHERY INDICATORS

CHART 1 - FISHERY LANDINGS for SELECTED STATES

In Millions of Pounds



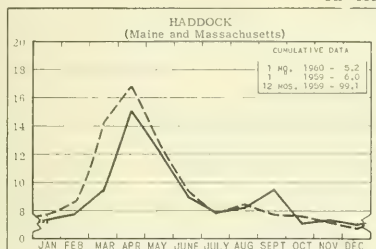
LEGEND:
..... 1946
----- 1947
----- 1948



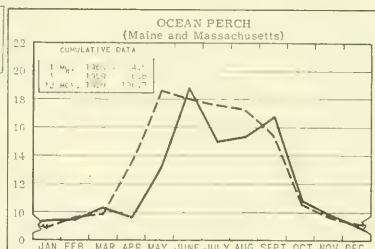
1/ONLY PARTIAL-INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH
LANDING AT PRINCIPAL PORTS.

CHART 2 - LANDINGS for SELECTED FISHERIES

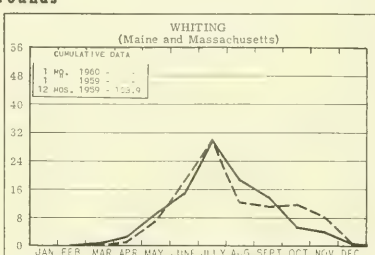
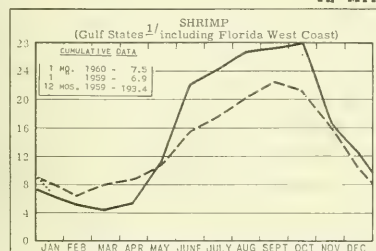
In Millions of Pounds



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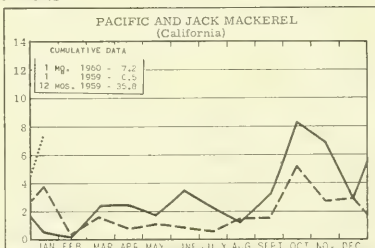
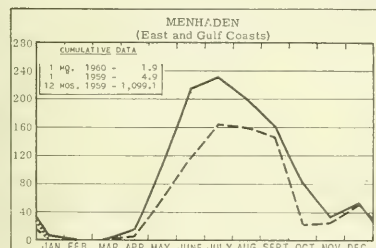


In Millions of Pounds



^{1/2}ALA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

In Thousands of Tons



In Thousands of Tons

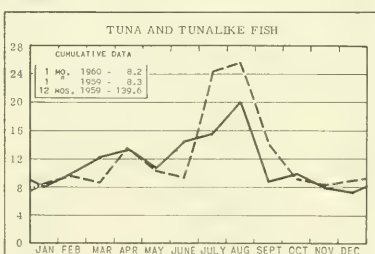
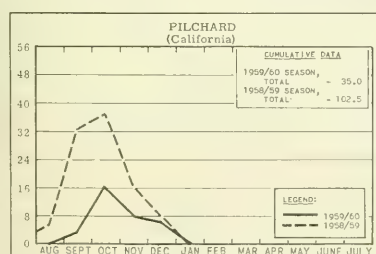
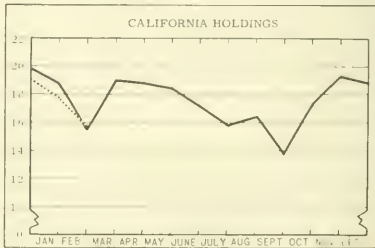
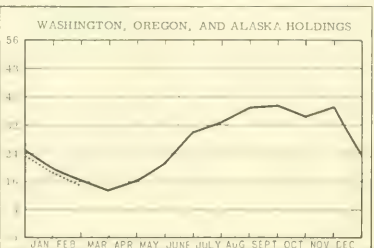
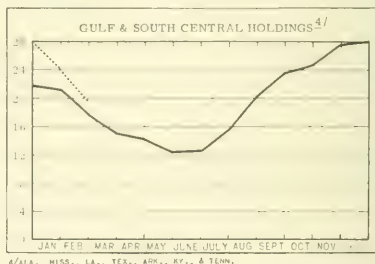
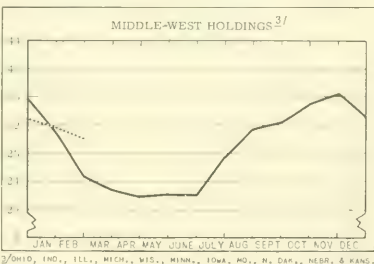
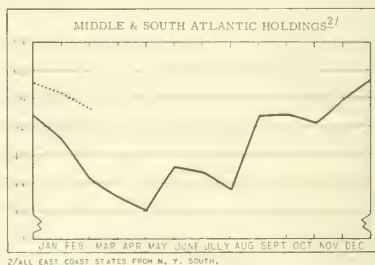
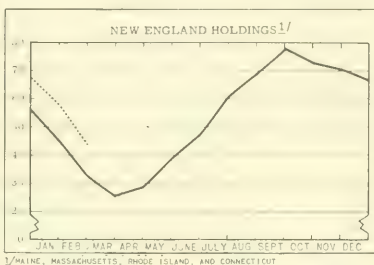
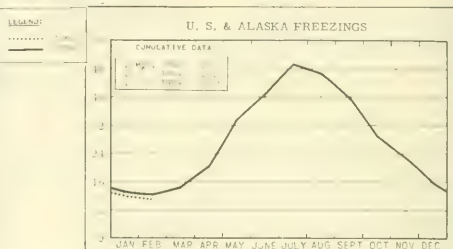
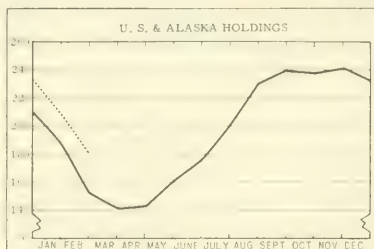


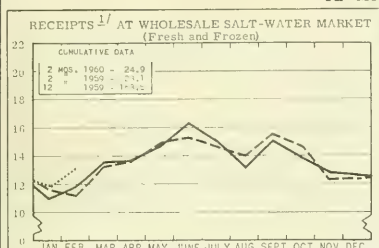
CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS * In Millions of Pounds



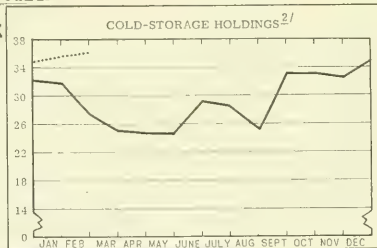
* Excludes salted, cured, and smoked products.

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

In Millions of Pounds

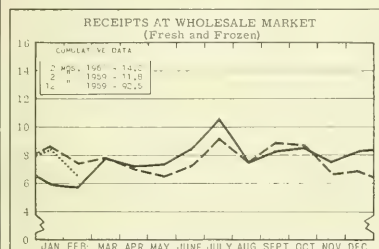


NEW YORK CITY

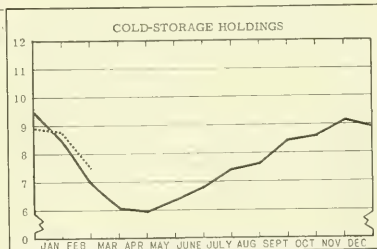


^{1/}INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.

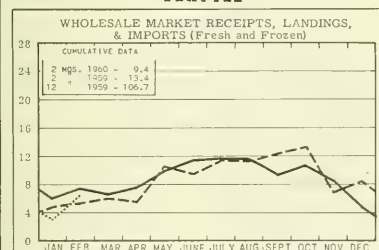
^{2/}AS REPORTED BY PLANTS IN METROPOLITAN AREA.



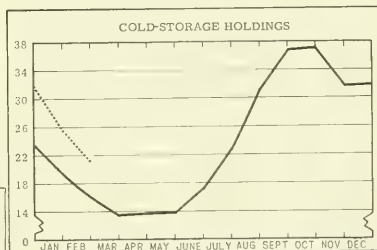
CHICAGO



SEATTLE



BOSTON



LEGEND:

..... 1960

----- 1959

----- 1958

CHART 5 - FISH MEAL and OIL PRODUCTION - U.S. and ALASKA

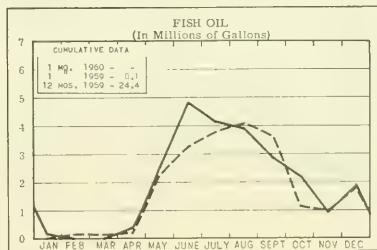
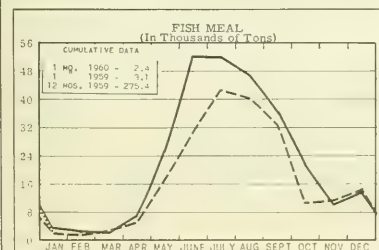
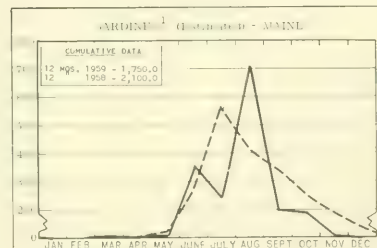
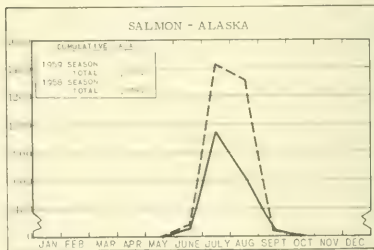
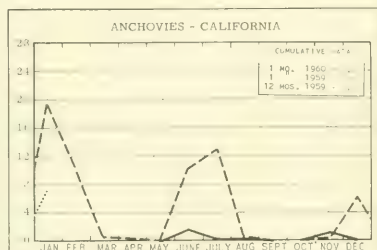
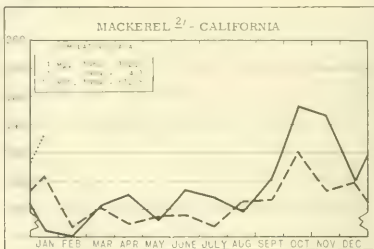
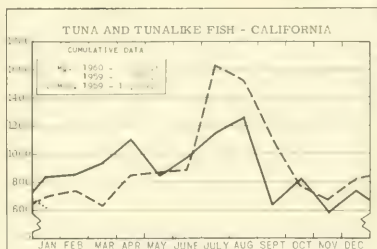


CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

In Thousands of Standard Cases



STANDARD CASES

Variety	No. Cans	Designation	Net Wgt.
SARDINES.....	100	$\frac{1}{4}$ drawn	$8\frac{1}{2}$ lbs.
SHRIMP.....	48	--	5 lbs.
TUNA.....	48	$\frac{1}{2}$ tuna	6-6.7 lbs.
PILCHARDS...	48	#1 oval	13 lbs.
SALMON.....	48	1-lb. tall	16 lbs.
ANCHOVIES...	48	H	8 lbs.

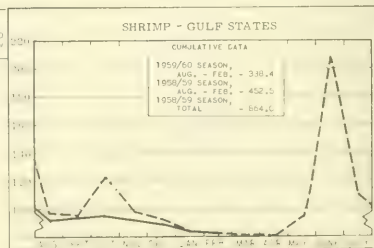
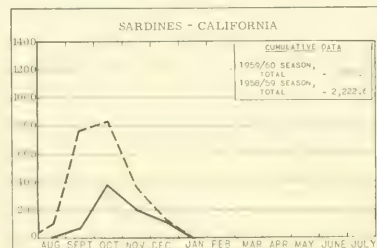
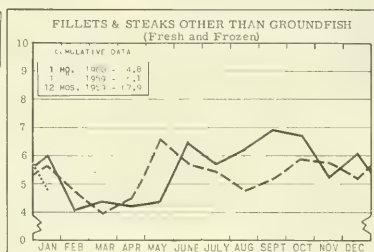
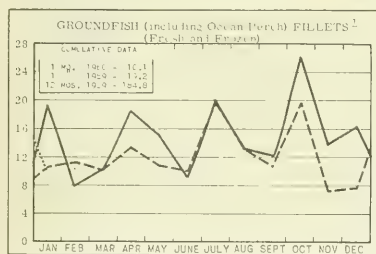
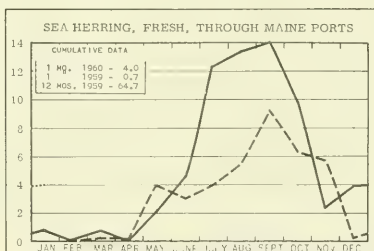
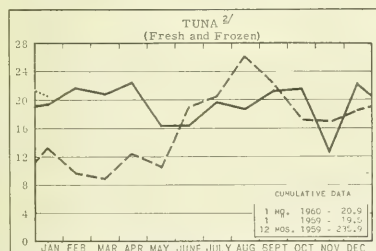
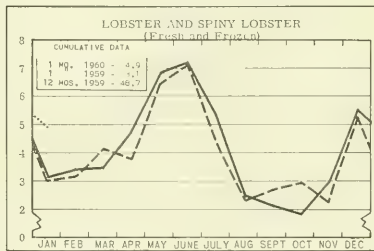
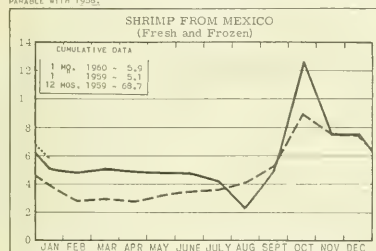


CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

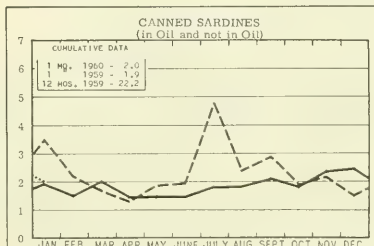
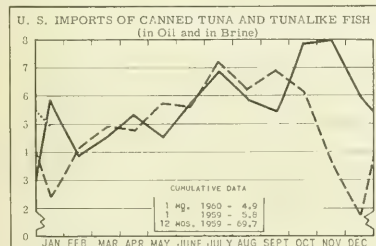
In Millions of Pounds

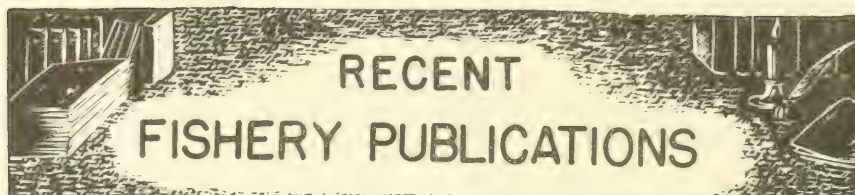


¹SINCE SEPTEMBER 15, 1959, FISH FILLET BLOCKS ARE CLASSIFIED UNDER A DIFFERENT CATEGORY THAN FILLETS; THEREFORE, 1959 DATA ARE NO LONGER COMPARABLE WITH 1960.



^{2/} EXCLUDES LOINS AND DISCS.





RECENT FISHERY PUBLICATIONS

FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

- CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
SL - STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

- | Number | Title |
|----------|--|
| CFS-2175 | - Louisiana Landings, June 1959, 2 pp. |
| CFS-2179 | - Shrimp Landings, August 1959, 6 pp. |
| CFS-2184 | - California Landings, July 1959, 4 pp. |
| CFS-2192 | - Mississippi Landings, October 1959, 2 pp. |
| CFS-2193 | - Fish Meal and Oil, November 1959, 2 pp. |
| CFS-2208 | - Texas Landings, November 1959, 3 pp. |
| CFS-2211 | - Rhode Island Landings, October 1959, 3 pp. |
| CFS-2213 | - Maine Landings, November 1959, 3 pp. |
| CFS-2214 | - New York Landings, November 1959, 4 pp. |
| CFS-2215 | - North Carolina Landings, December 1959, 4 pp. |
| CFS-2217 | - Frozen Fish Report, December 1959, 8 pp. |
| CFS-2221 | - New Jersey Landings, December 1959, 3 pp. |
| CFS-2224 | - New York Landings, December 1959, 4 pp. |
| CFS-2230 | - California Landings, August 1959, 4 pp. |
| CFS-2231 | - Fish Sticks and Portions, 1959 Annual Summary, 3 pp. |
| CFS-2233 | - California Landings, September 1959, 4 pp. |

Wholesale Dealers in Fishery Products, 1959

- (Revised):
SL-4 - Rhode Island.
SL-5 - Connecticut.

Sep. No. 581 - Processing and Quality Studies of Shrimp Held in Refrigerated Sea Water and Ice: Part 1 - Preliminary Observations on Machine-Peeling Characteristics and Product Quality.

Sep. No. 582 - Braided Synthetic Twines and Their Use in the New England Trawl Fishery.

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

California Fishery Products Monthly Summary, December 1959; 14 pp. (Market News Service,

U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) California cannery receipts of tuna and tunalike fish, mackerel, anchovies, and sardines; pack of canned tuna, mackerel, anchovies, and sardines; marketfish receipts at San Pedro, Santa Monica, and Eureka areas; California imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; American Tuna Boat Association auction sales; for the month indicated.

(Chicago) Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Market Prices, November 1959, 13 pp. (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces for fresh- and salt-water fish and shellfish; and wholesale prices for fresh and frozen fishery products; for the month indicated.

Gulf Monthly Landings, Production, and Shipments of Fishery Products, January 1960, 8 pp. (Market News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; sponge sales; and imports at Port Isabel and Brownsville, Tex., from Mexico; for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, January 1960, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 So. King St., Hampton, Va.) Fishery landings and production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.

New England Fisheries--Monthly Summary, December 1959, 23 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Reviews the principal New England fishery ports, and presents food fish landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, Provincetown, and Woods Hole), Maine (Portland and Rockland), Rhode Island (Point Judith),

and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and landings and ex-vessel prices for fares landed at the Boston Fish Pier and sold through the New England Fish Exchange; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly Summary for November 1959, 20 pp. (Market News Service, 155 John St., New York 38, N. Y.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, imports entered at New York City, primary wholesaler prices for frozen products, and marketing trends; for the month indicated.

Production of Fishery Products in Selected Areas of Alabama, Florida, Louisiana, Mississippi, and Texas, 1958, by Peter DiMarco, 25 pp., processed, December 1959. (Available free from the U. S. Fish and Wildlife Service, 609-611 Federal Bldg., 600 South St., New Orleans, La.) The first part reports on trends and conditions in Gulf Coast fisheries during 1958 and gives a resume of the individual fisheries. For the shrimp fishery, a detailed account is presented of total landings by states, extent of coverage of landings, composition of shrimp landings by species and sizes, prices, canning, imports, cold storage stocks and freezings, general trends and developments, Pacific Coast shrimp developments, new leaflet issued on shrimp gear, and voluntary breaded shrimp standards. Discusses production and market conditions for the oyster and blue crab fisheries, as well as imports of fresh and frozen fish and shellfish. The second part includes shrimp closed seasons in effect in the Gulf States during 1958, minimum shrimp size regulations, conversion factors and container capacities, and shrimp sizes. The second part also contains statistical tables showing total fishery products landings by areas and species, by species and months, by areas and species by months; fishery imports through the New Orleans Customs District and Port Isabel and Brownsville, Tex.; and LCL express shipments from New Orleans for 1958 by months and destination. Also includes tables showing monthly range of wholesale prices of fishery products on the New Orleans French Market; Gulf States weekly oyster and shrimp packs, 1957-58 season and packs by season 1953/58; summary of Gulf shrimp landings for selected areas, 1957-58 and 5-year averages; and fishery products market classifications in the Gulf area.

Production of Fishery Products in Selected Areas of Virginia, Maryland, and North Carolina, 1958, by William N. Kelly, 46 pp., processed. (Available free from the Market News Service, U. S. Fish and Wildlife Service, 18 So. King St., Hampton, Va.) Reviews commercial landings of fish and shellfish and the production of crab meat and shucked oysters as reported by producers and wholesalers in the specific areas mentioned. Covers production of fishery products by months and by localities, shrimp landings in certain North Carolina localities, and production of certain shellfish in selected areas of Virginia and Maryland. The statistics in this summary represent partial commercial fisheries production only and do not show complete

commercial landings or production for a given area, individual state, or the Chesapeake Bay area as a whole. However, the data do give an indication as to the trend in fisheries production for the specific areas designated and do reflect the over-all production trend.

(Seattle) Washington, Oregon, and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, January 1960, 9 pp. (Market News Service, U. S. Fish and Wildlife Service, Pier 42 South, Seattle 4, Wash.) Includes landings and local receipts, with ex-vessel and wholesale prices in some instances, as reported by Seattle and Astoria (Ore.), wholesale dealers; Seattle's other trawl landings and prices; Northwest Pacific halibut landings; receipts of canned fishery products; and Washington shrimp landings; for the month indicated.

THE FOLLOWING MARKET NEWS LEAFLETS ARE AVAILABLE FROM THE BRANCH OF MARKET NEWS, BUREAU OF COMMERCIAL FISHERIES, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C.

Number	Title
MNL-7	- Mexican Fisheries, 1958.
MNL-8	- Portuguese Fishing Industry.
MNL-9	- Fishery Developments in the Philippines for 1958.
MNL-10	- Swedish Fisheries for 1958.
MNL-11	- Spanish Fish and Shellfish Industry, 1958.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Take a Can of Salmon, Circular No. 60, 17 pp., illus., printed, 15 cents, 1960. The recipes in this booklet tested in the Bureau's own test kitchens, are calculated to satisfy a wide range of tastes. There are "Salmon Crepes Bayou," which might suit the gourmet hostess planning a small buffet supper; and then there are "Salmonburgers," a tangy snack easily prepared by the busy mother of small children. Most of the recipes are illustrated with beautifully planned color photos. The economy, versatility, and nutritional value of canned salmon are emphasized in the booklet. "If overweight is a problem in your family, you'll be glad to know that equal portions of salmon and lamb chops contain about the same amount of protein but four ounces of salmon contain only 150 calories while four ounces of lamb chops contain 450 calories," suggests the author.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ALGAE:

"Algae as a Source of Human Food," article, *Nutrition Reviews*, vol. 17, August 1959, pp. 238-240, printed. Nutrition Foundation, Inc., 99 Park Ave., New York 16, N. Y.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

ALGINATES:

"Information and Evaluation of Alginates. I," by Willibald Diemari and Hans Hermann Weichel, article, *Deutsche Lebensmittel-Rundschau*, vol. 54, 1958, pp. 51-55, 76-79, printed in German. Deutsche Lebensmittel-Rundschau, Wissenschaftliche Verlagsgesellschaft m.b.h., Birkewaldstrasse 44, Stuttgart N., Germany.

Sodium Alginate as a Blood-Plasma Substitute, by Masanobu Tomoda, Kiyoshi Iguchi, and Eichi Ikeda, Japanese Patent No. 4593. Japanese Patent Office, Tokyo, Japan, June 11, 1958.

AMINO ACIDS:

"Biological Availability of Amino Acids in Fish Meals and Other Protein Sources," by L. E. Ousterhout, C. R. Grau, and B. D. Lundholm, article, *Journal of Nutrition*, vol. 69, September 1959, pp. 65-73, printed. *Journal of Nutrition*, The Wistar Institute of Anatomy & Biology, 36th St. at Spruce, Philadelphia 4, Pa.

ANIMAL FEEDING:

"Sources of Unidentified Factors for Practical Poultry Diets. 1--The Value of Fish Meals, Meat Meals, and Fish Solubles for Chicks and Broilers," "2--The Value of Fish Solubles, Dried Whey, Dried Distillers' Solubles, and Certain Fermentation Products for Chick and Broiler Diets," and "3--The Value of Fish Solubles, Dried Whey, and Certain Fermentation Products for Turkeys," by J. D. Summers, W. F. Pepper, and S. J. Slinger, articles, *Poultry Science*, vol. 38, July 1959, pp. 816-825, 846-854, and 922-928, respectively, printed. Poultry Science Association, Kansas State College, Manhattan, Kans.

ANTIBIOTICS:

"The Use of Aureomycin for Fish Preservation under South African Conditions," by D. L. Georgala, Progress Report No. 38, 5 pp., printed. Fishing Industry Research Institute, University of Cape Town, Rondebosch, Union of South Africa, February 1959.

BARENTS SEA:

Promyslovye Ryby Barentseva Moria i Ikh Pitanie (Rukovodstvo Dlya Plavosostava Tralovogo Flota) (Fishes in the Barents Sea), by K. Konstantinov, 47 pp., illus., printed in Russian. Priblarnyi Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khoziaistva i Okeanografii im. N. M. Knipovicha (PINRO), Murmanskoe Knishnoe Izd-vo, U. S. S. R., 1959.

BIOCHEMISTRY:

"On Actomyosin of Squid Muscle from Salt-Extract Preparation of Actomyosin," by Juichiro J. Matsumoto, article, *Bulletin of the Japanese Society of Scientific Fisheries*, vol. 24, no. 2, 1958, pp. 125-132, printed. Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

"Biochemical Studies on the Growth and Maturation of Fish Organs. III--Vitamin B₂ Contents of Fish Organs," by Yasuyuki Shimidzu, article, *Nankai-ku Suisan-kenkyusho Hokoku*, vol. 6,

1957, pp. 18-24, printed. Nankai ku Suisan, Kochi, Japan.

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MOTION PICTURES AND RECIPE BOOKLET,
IN COLOR, FEATURE CANNED SALMON

Canned salmon can be the basis of good meals and intriguing and entertaining motion-pictures, as shown in a three-unit story of salmon--two 16 mm. 14-minute sound-color films and a recipe booklet in color--recently released by the U. S. Bureau of Commercial Fisheries.

The titles of the films, *Salmon - Catch to Can* and *Take a Can of Salmon*, are descriptive of the subject matter. The first begins with the life cycle of the salmon and the three common ways of catching them and ends with getting the salmon into the can. The second "takes a can of salmon" and shows attractive meals as housewives in six typical American cities prepare them.



Salmon Crepes Bayou.

Alaska is the site of filming of most of the first picture. Gillnetting, trolling and purse-seining for salmon are shown in some detail. There are also scenes on salmon biology which should be especially interesting to science classes in grade or high schools. These are followed by several in-plant sequences showing the canning of the product.

In the second film, six typical American cities are visited. Each visit is introduced by some exceptionally good pictures of the better-known landmarks. The cities are San Francisco, Seattle, Miami, Chicago, New Orleans, and New York. A favorite recipe, based upon historical or other characteristics of each city is developed in the film. For example, in San Francisco a can of salmon is utilized in an old Chinese recipe. In Seattle a can of salmon is converted into an attractive outdoor meal. All of the recipes shown in the *Take a Can of Salmon* film, and many others, are included in the recipe booklet which, incidentally, bears the same name as the film.

The motion pictures are so arranged that they can be used for two 14-minute showings or used in sequence for a 28-minute show. These films, as are most other Bureau films, are cleared for use on television.

The films and the recipe booklet are sponsored by the Canned Salmon Institute, Inc., and produced by the U. S. Bureau of Commercial Fisheries under contract with commercial motion picture producers in New York City. The films will be distributed on a free loan basis through Bureau sources and the Bureau's 170 cooperating film libraries throughout the country.

Applications for loan should be sent to the Visual Education Unit, Bureau of Commercial Fisheries, Post Office Box 128, College Park, Maryland. A catalog of other available fishery educational films may be secured from the College Park film distribution center or from the Fish and Wildlife Service, Washington 25, D. C.

The recipe booklet may be purchased for 15 cents from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. A 25-percent discount will be given on orders of 100 or more copies of this publication sent to one address.

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#4463X *Fishes*

ROBERT H GIBBS JR

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COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries
prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
H. M. Bearse, Assistant Editor

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PROCESSING AND QUALITY STUDIES OF SHRIMP HELD IN REFRIGERATED SEA WATER AND ICE

Part 3 - Holding Variables and Keeping Quality of the Raw Whole Shrimp

By Harry Seagran,* Jeff Collins,* and John Iverson**

ABSTRACT

Data are given on the keeping quality of raw whole pink shrimp in (1) ice and (2) refrigerated sea water at 30° and 32° F., at sodium chloride concentrations of 3 percent and 6 percent, and at shrimp-to-brine ratios of 1 to 1 and 1 to 2. The limit of acceptability of the shrimp was established subjectively and the relative quality was estimated by objective methods. An improved keeping quality of shrimp was obtained at (1) the lower temperature, (2) the higher brine concentration, and (3) the higher shrimp-to-brine ratio.

BACKGROUND

This report is part of a series in which the potential use of refrigerated sea water for holding Alaskan shrimp is being studied.

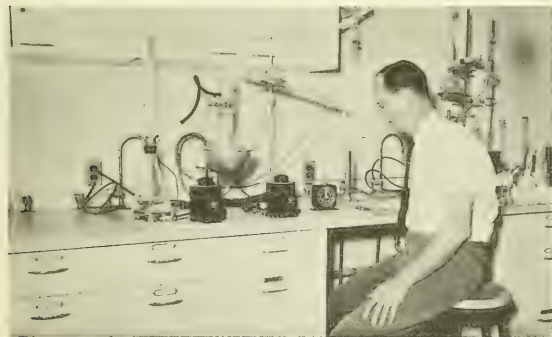


Fig. 1 - Chemist analyzing shrimp for volatile acid.

hold them in ice and then to see how their quality changed, as determined objectively, with time of holding.

MATERIAL: About 120 pounds of whole fresh pink shrimp (*Pandalus* species) was obtained from Wrangell, Alaska. The shrimp had been landed within a few hours of capture. They were held overnight without ice (air temperature approximately 30° to 32° F.) and shipped via air to the laboratory the following day. The

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The purpose of the work reported here was to determine the effect of temperature, brine concentration, and shrimp-to-brine ratio on the keeping quality of the raw whole shrimp in comparison with the keeping quality of such shrimp held in ice.

EXPERIMENTAL

The experimental approach was to hold shrimp in refrigerated sea water at different temperatures, brine concentrations, and shrimp-to-brine ratios as well as to

shrimp were then briefly rinsed with cold fresh water and allowed to drain for a few minutes. At this point, hereafter referred to as zero time, approximately 30 hours had elapsed since the capture of the shrimp.

HOLDING METHODS: All samples held in refrigerated sea water were placed (together with the appropriate brine¹ solution) in closed C-enamel, No. 10 cans, which were essentially filled. This closed system was described in the previous report (Collins, Seagran, and Iverson 1960). The cans containing the individual samples were held in large thermostatically-controlled liquid systems (Collins 1960).

Sample Number	Holding Method	Temperature	NaCl Concentration	Shrimp-to-Brine Ratio
		Degrees F.	Percent	
1	ice	32	-	-
2	RSW	32	-	1 to 1
3	RSW	30	3	1 to 1
4	RSW	30	3	1 to 2
5	RSW	30	6	1 to 1

The variables employed are shown in table 1. Samples held in ice were mixed with at least three times their weight of ice and placed in large cans with perforated bottoms. These cans were held under an additional blanket of ice in an insulated ice chest. Samples were re-iced approximately every other day.

The series was continued for 10½ days from zero time. At selected intervals, samples were withdrawn, the shrimp were quickly peeled by hand, and the whole unwashed meats were frozen at -20° F. in glass containers. As needed for analysis, a sample was softened by immersing the glass container in cold water. A blade assembly of an electric blender was screwed on the glass container, and the sample was blended until a homogeneous mixture resulted. The mixture was sampled immediately.

ANALYTICAL METHODS: Analyses were carried out as previously described (Collins, Seagran, and Iverson 1960) for total solids, total chloride, total nitrogen, nonprotein nitrogen, amino nitrogen, total volatile acid, and trimethylamine. The limit of acceptability of the ice-held and refrigerated-sea water-held shrimp was obtained subjectively by smelling the cold, drained, whole shrimp.

RESULTS AND DISCUSSION

The results of the analyses are given in table 2. In general, regardless of holding method, all samples showed a progressive apparent loss of total solids as a function of holding time. It is not known, however, to what degree this apparent loss is due to actual leaching of soluble constituents of the meats or to the uptake of water by the tissue, which is considerable for fish tissue held in certain aqueous systems (Seagran 1956). Of the refrigerated sea-water samples, the one held in 6-percent brine showed the least loss, probably owing much to the relatively higher amounts of salt absorbed by this sample. In addition, an increase in holding temperature or a lowering of the shrimp-to-brine ratio caused a slightly greater loss of solids. The iced sample showed the greatest loss of solids as a function of holding time. With the iced sample, it is likely that a true leaching accounted for most of the loss, owing to the lack of electrolyte in the washing medium and to the very low levels of chloride ion retained by the meats (Seagran 1956).

In the analyses of protein nitrogen (total nitrogen less nonprotein nitrogen), the sample held in 6-percent brine also showed the least decrease as a function of holding time. As was suggested above, assuming that the total solids for this sample included relatively more salt than did the samples held in 3-percent brine, the greater relative retention of protein by the sample held in 6-percent brine is even more meaningful. All samples, however, showed a rather slow progressive apparent loss of protein, the rates being approximately the same except for the samples held in 6-percent brine.

¹Sodium chloride solutions were used rather than natural sea water (Collins 1960).

In the analysis of the total nonprotein nitrogen fraction of the meats, a rapid leaching by the brine (or the ice-melt) was indicated. As with total solids, there was an indication that an increase in holding temperature or a lowering of shrimp-to-brine ratio caused a slightly greater loss, at a given salt concentration, until equilibrium was reached. The nonprotein fraction reached a minimum value in brine

Table 2 - Analytical Data^{1/} Obtained on Pink Shrimp Held in Ice and in a Closed Refrigerated Sea-Water (RSW) System

Sample Number	Holding Time Days	Total Solids Percent	Total Chloride Percent NaCl	Total Nitrogen Percent	Nonprotein Nitrogen Percent	Amino-N Nitrogen Percent	Volatile Acid Meq. H+ 100 Gm.	Trimethylamine Mg. TMA-N 100 Gm.
Zero-time	0	20.67	0.603	3.014	0.846	0.394	0.025	0.60
1 (ice, 32° F.)	0.5	19.42	0.648	2.897	0.791	0.366	0.069	0.55
	1.5	17.40	0.528	2.601	0.673	0.295	0.073	0.54
	3.5	15.98	0.416	2.352	0.566	0.246	0.073	0.52
	5.5	15.19	0.337	2.313	0.498	0.213	0.090	0.57
	6.5	14.29	0.221	2.136	0.436	0.172	0.067	0.82
	8.5	13.33	0.126	2.016	0.325	0.133	0.114	1.33
	10.5	12.87	0.107	1.909	0.265	0.140	0.149	2.58
2 (RSW-3%, 1 to 1, 32° F.)	0.5	19.80	1.096	2.883	0.720	0.322	0.038	0.05
	1.5	18.28	1.443	2.540	0.591	0.252	0.023	0.10
	3.5	16.92	1.664	2.272	0.504	0.199	0.073	1.05
	5.5	15.86	1.768	2.160	0.456	0.170	0.266	15.4
	6.5	15.89	1.772	2.205	0.471	0.174	0.554	26.4
	8.5	15.19	1.811	2.070	0.429	0.159	1.403	42.0
	9.5	15.02	1.804	2.036	0.445	0.143	1.859	46.8
	10.5	14.96	1.854	2.052	0.447	0.148	2.710	56.4
3 (RSW-3% 1 to 1, 30° F.)	0.5	19.63	1.106	2.791	0.674	0.317	0.020	0.07
	1.5	18.50	1.374	2.637	0.640	0.271	0.021	0.25
	3.5	17.23	1.552	2.391	0.525	0.198	0.015	0.55
	5.5	16.64	1.608	2.158	0.456	0.195	0.085	5.28
	6.5	16.29	1.738	2.075	0.417	0.185	0.314	14.9
	8.5	15.87	1.679	2.079	0.500	0.179	0.671	28.8
	9.5	15.69	1.712	2.156	0.477	0.178	1.052	39.4
	10.5	15.61	1.737	2.000	0.504	0.176	1.639	50.4
4 (RSW-3%, 1 to 2, 30° F.)	0.5	19.68	1.148	2.778	0.717	0.317	0.061	0.15
	1.5	18.20	1.468	2.518	0.601	0.230	0.037	0.19
	3.5	16.58	1.569	2.264	0.465	0.180	0.045	0.85
	5.5	15.88	1.817	2.090	0.420	0.162	0.166	6.93
	6.5	15.62	1.922	2.048	0.394	0.151	0.250	12.3
	8.5	15.32	2.036	1.897	0.395	0.141	0.691	23.1
	9.5	14.97	2.013	1.858	0.389	0.128	1.061	29.4
	10.5	14.98	2.002	1.962	0.412	0.127	1.561	38.0
5 (RSW-6%, 1 to 1, 30° F.)	0.5	21.53	1.923	3.000	0.794	0.336	0.018	0.00
	1.5	20.72	2.663	2.590	0.572	0.246	0.053	0.12
	3.5	19.38	2.907	2.417	0.420	0.205	0.067	0.19
	5.5	18.80	3.065	2.338	0.445	0.186	0.111	1.05
	6.5	18.46	3.034	2.219	0.442	0.179	0.078	2.20
	8.5	17.93	3.032	2.258	0.446	0.180	0.295	13.6
	9.5	17.99	3.117	2.261	0.452	0.193	0.500	24.6
	10.5	17.58	3.082	2.159	0.430	0.173	0.716	37.6

^{1/}Data calculated on a wet-weight basis.

and then held rather constant at values characteristic for each refrigerated sea-water holding system. Considering the fact that the salt and water contents are also increasing with holding time, it is apparent that nonprotein nitrogen was slowly and continuously forming, presumably by enzyme hydrolysis of protein. This situation becomes more apparent after the initial leaching has been accomplished. The free amino acids appeared to behave in a fashion similar to the total nonprotein nitrogen fraction, except that the free acids continued to decrease slightly, suggesting that this fraction was preferentially being utilized as a source of nutrients for bacterial growth. The protective effects of lower temperature and 6-percent salt were also noticeable in this latter respect.

Salt uptake in refrigerated sea water was rapid, particularly for the sample held in 6-percent brine, so that after about 3½ days holding time, each sample only

slowly increased to an equilibrium. The content of salt (as NaCl) attained at equilibrium in the 6-percent and 3-percent brines was approximately 3 percent and 1.8 percent, respectively.

The first definite off-odors detected in the whole shrimp occurred after $8\frac{1}{2}$ days holding in ice, after $5\frac{1}{2}$ days in either 3-percent or 6-percent^{2/} refrigerated sea water at 30° F., and after $3\frac{1}{2}$ days in refrigerated sea water at 32° F. The odor was determined on the whole unwashed shrimp, and the objective tests were carried out on the peeled unwashed shrimp. A strict comparison of the samples held in ice with those held in refrigerated sea water in this study thus would not seem feasible, since in the former case most spoilage products would be washed from the meats by the generous ice-melt. In the case of the refrigerated sea-water samples, however, the spoilage products would be retained within the system and, it is believed, to a large degree by the shrimp. Commercially, whole shrimp are subjected to a continuous washing operation with large amounts of water while being mechanically peeled. Spoilage products accumulating during holding in refrigerated sea water may be materially reduced by such washing action (Collins 1960). Accordingly, the keeping quality for samples held in refrigerated sea water given in this report probably represent minimum storage life for shrimp held under similar conditions. The data given for ice-held shrimp, on the other hand, probably represent maximum storage life, owing to the ideal icing conditions employed.

Distinct differences in the keeping characteristics of the various samples held in refrigerated sea water were noted, both from objective and subjective standpoints. For example, lowering the temperature 2 degrees (from 32° F. to 30° F.) gave an effective increase of approximately 2 days in storage life, based on odor, volatile acid, and trimethylamine data. Further, at a given temperature (30° F.), an increase of the salt concentration from 3 percent to 6 percent increased the storage life from 1 to 2 days. Changing the shrimp-to-brine ratio had no apparent effect on storage life.

From the data of this study, spoilage products contained in raw shrimp in excess of 1 milligram of trimethylamine nitrogen per 100 grams of wet meat and in excess of 0.1 milliequivalent of volatile acid per 100 grams of wet meat would indicate a product of limited subsequent storage life. The trimethylamine test seemed particularly sensitive to changes in the keeping quality of raw shrimp.

From a practical standpoint, when shrimp are to be processed within 3 days from time of catch, assuming holding conditions are good (maximum holding temperature of 32° F.), there would appear to be no need of using a 6-percent brine holding system. On the other hand, the potential advantages of the 6-percent system for somewhat longer holding periods are considerable from the standpoint of slowing down bacterial processes. Earlier work by Roach and Harrison (1954) in Canada suggested that holding raw shrimp in sodium chloride brines somewhat saltier than sea water (up to 6 percent NaCl) gives a firmer, better quality, more easily picked (Collins 1960) product than does holding in chilled sea water (approximately 3 percent salt) at the same temperature for the same length of time. The relatively high salt content of shrimp held in such a system should be recognized, although it is likely that the generous washing that the meats receive when the shrimp are peeled by machine would materially reduce the salt content (Collins 1960). Since salt is normally added to a commercial pack, a slightly higher salt content in the shrimp used for canning may not be objectionable for such packs.

SUMMARY

1. A $10\frac{1}{2}$ -daytime study, using whole fresh pink shrimp held in refrigerated sea water and in ice, is described. The effects of certain holding variables (temperature, 30° F. and 32° F.; brine concentration, 3 percent and 6 percent NaCl; and

^{2/} Although subjective data are difficult to evaluate, the degree of odor measured indicated that shrimp held in 6-percent refrigerated sea water kept considerably longer (1 to 2 days) than did those held in 3-percent refrigerated sea water (at 30° F.). Objective data confirmed this conclusion.

shrimp-to-brine ratio, 1 to 1 and 1 to 2) on the keeping quality of the raw whole shrimp was studied.

2. For all holding methods, the shrimp meats showed a progressive decrease in contained solids with increased holding time. Total solids content appeared to decrease at a greater rate with higher temperature, with lower brine concentration, and with lower shrimp-to-brine ratio.

3. Nonprotein nitrogen slowly formed presumably by enzyme hydrolysis. Free amino acids appeared to be preferentially utilized for bacterial growth. The protective effects of lower temperature and higher salt concentration were observed in this latter respect.

4. The salt content (as NaCl) of the meats attained at equilibrium in the 6-percent and 3-percent brines was approximately 3 percent and 1.8 percent, respectively.

5. The maximum storage life of fresh whole shrimp in ice appeared to be approximately $8\frac{1}{2}$ days. The minimum storage life of fresh whole shrimp in 3-percent refrigerated sea water at 30° F., in 3-percent refrigerated sea water at 32° F., and in 6-percent refrigerated sea water at 30° F. appeared to be at least $5\frac{1}{2}$, $3\frac{1}{2}$, and $6\frac{1}{2}$ days, respectively. It appeared that either lowering the temperature from 32° to 30° F. or increasing the brine concentration from 3 percent to 6 percent sodium chloride gave an effective increase of storage life of from 1 to 2 days, other conditions being kept constant.

6. Spoilage products contained in raw shrimp in excess of approximately 1 milligram of trimethylamine nitrogen per 100 grams of wet meat and in excess of 0.1 milliequivalent of volatile acid per 100 grams of wet meat would indicate a product of limited subsequent storage life.

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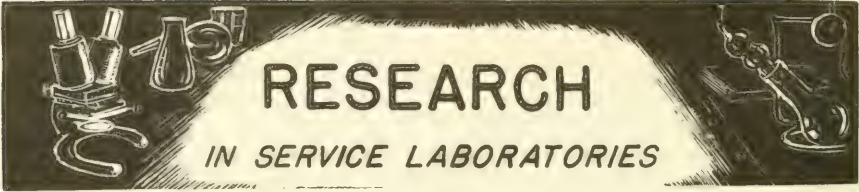
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RESEARCH

IN SERVICE LABORATORIES

TECHNICAL NOTE NO. 55 - RECOMMENDED PRACTICES FOR PROCESSING CHILLED AND FROZEN WHITING

ABSTRACT

This paper contains recommendations for handling and processing whiting (*Merluccius bilinearis*) which will upgrade product quality and value, and increase consumer acceptance. Although whiting constitutes one of the major species of fish landed in New England, its delicate tissue structure facilitates rapid quality loss during handling and processing. A check list which may be used by the fisherman, processor, and wholesaler to insure maintenance of product quality is included in the paper.

INTRODUCTION

Although large quantities of whiting (*Merluccius bilinearis*) are landed in the New England area annually, the value of this fishery is relatively small. The low



Fig. 1 - Packaging fillets of whiting in a modern processing plant.

return is due primarily to the delicate nature of the fish, since it rapidly loses its initial high quality under normal pre-processing and processing conditions. A study was therefore undertaken to determine practices in which the initial high quality of the whiting could be retained. The immediate objective of the study was to recommend practices for processing chilled and frozen whiting that would: (1) assist in upgrading product quality, (2) increase consumer acceptance, (3) increase value, and (4) act as a check list for fisherman, processor, and wholesaler.

PROCEDURE

Information required for this paper was gathered from various organizations representative of the whiting industry. Plants were visited to observe current commercial practices. Samples were obtained and evaluated for quality in relation to the quality of the original raw material and to the production methods employed. Data obtained in this study, together with the industry's comments and a consideration of the latest methods of quality control, resulted in the following recommendations.

RECOMMENDED PRACTICES

This specification applies to fresh or frozen, clean, whole, wholesome fillets cut away from either side of whiting (*Merluccius bilinearis*) and to fresh or frozen, clean, wholesome "headed and gutted" whiting.

Requirements for good quality are explained in the following sections and, as an aid for convenient reference, are listed in table 1. The subjects discussed are raw fish, wash media, products, packaging, refrigeration, and transportation.

Table 1 - Quality Requirements for Whiting

Factor Specified	Requirements for Fillets and Headed and Gutted Whiting	
Raw Fish	a. Appearance--bright; not damaged. b. Odor--characteristically fresh. c. Eyes--prominent and clear. d. Gills--bright red; no off-odor. e. Scales--firmly adhering and glistening. f. Slime--transparent or creamy white; if present. g. Flesh--firm, elastic, and tight on bones. h. Abdominal blood--bright red.	
Wash Media	a. Cold brine. b. Chlorinated sea water; 5 to 10 ppm. chlorine. c. Potable water.	
Product	a. Flesh--firm, resilient; white, pinkish white, off-white. b. Chalky, jellied, diseased, or parasitized tissue--none. c. Slight discoloration or yellowing--insignificant areas allowed.	
	Fillets d. Fins, scales, blemishes, black-belly linings, blood spots, bones--none. e. Scraps, badly ruptured fillets--none. f. Minimum weight--2 ounces.	Headed and Gutted Whiting d. Scales, gills, viscera spawn--none. e. Minimum weight--3 ounces.
Packaging	a. 1-pound cartons with or without overwrap. b. 1- to 1½-pound packages with cellophane or equivalent wrap. c. Packed in 5- to 10-pound cartons.	a. 1½- to 10-pound cartons; tail ends of fish alternating and long axes of fish parallel.
	Carton overwrap--moisture-proof, heat-sealable on all cartons.	
Refrigeration	a. Chilled--held at 32° F. to a maximum of 36° F. b. Freezing--frozen at -10° F. or lower. c. Frozen storage--held at 0° F. or lower.	
Transportation	a. Chilled--held at 32° F. to a maximum of 36° F. b. Frozen--held at 0° F. or lower.	

RAW FISH: Immediately after capture, the fish shall be chilled and maintained in a thoroughly chilled condition by being packed in adequate amounts of clean, finely crushed or flaked ice. Fillets and headed and gutted whiting shall be processed only from good or excellent quality fish.

Fish of such quality have the following characteristics: appearance that is bright and that shows no damage; odor that is characteristically fresh; eyes that

are prominent and clear; gills that are bright and red and that have no off-odor; scales that adhere firmly and that are glistening; slime that, if present, is transparent or creamy white; flesh that is firm, elastic, and tight on the bones; and blood in the abdomen that is bright red. (Fish in rigor and with no blemishes shall be considered excellent in quality.)

WASH MEDIA: In the production of fillets, they shall be cut from fish that were scaled and washed in cold brine, chlorinated sea water, or cold clean potable water. The fillets thus produced shall then be washed in a similar manner and drained prior to being packaged. The brine shall be no more than 15 degrees salometer, and the washing time shall not exceed 2 minutes. Chlorinated sea water shall have a residual of 5 to 10 parts per million of free chlorine. Fillets that are to be used in low-sodium diets shall not be dipped in brine or otherwise brine treated.

In the production of the headed and gutted product, the whiting shall be headed, thoroughly scaled, and eviscerated in accordance with good commercial practice. Good commercial practice shall mean that the spawn and visceral parts are completely removed except that a slight amount of "stringing" shall be allowed. Before being packaged, the headed and gutted whiting shall be washed and drained as described for the fillets.

PRODUCTS: The flesh of fillets shall be firm and resilient, and white, pinkish white, or off-white. The fillets shall be free of any tissue that is chalky, jellied, diseased, parasitized, or otherwise abnormal. Small insignificant areas of slight discoloration or yellowing shall be allowed. The fillets shall be free of fins, scales, and practically free of blemishes, black-belly lining, blood spots, and bones. The fillets shall weigh not less than 2 ounces. Scraps and badly ruptured fillets shall not be accepted.

The flesh of headed and gutted whiting shall be firm and resilient, and white, pinkish white, or off-white. The flesh shall be free of any tissue that is chalky, jellied, diseased, parasitized, or otherwise abnormal. Small insignificant areas of slight discoloration or yellowing shall be allowed. Headed and gutted whiting shall be free of scales, gills, viscera, and spawn. Headed and gutted whiting shall weigh not less than 3 ounces.

PACKAGING: Fillets that are to be frozen shall be packaged in 1-pound capacity cartons with or without inner wrap or shall be wrapped in amounts of 1 to 1½-pounds with cellophane or other suitable packaging material and shall be packed in 5- or 10-pound capacity cartons. Headed and gutted whiting shall be packaged in 1½- to 10-pound capacity cartons and shall be packed with tail ends alternating and long axes parallel. All cartons shall be overwrapped with a moisture-vapor-proof, heat-sealable overwrapping material.

REFRIGERATION: Packages of fillets or of headed and gutted whiting that are to be shipped in the unfrozen state shall be kept at temperatures of 32° F. to a maximum of 36° F. by packing them in boxes with ice or by keeping them in a room maintained at 32° F. to a maximum of 36° F.

Packages of fillets or of headed and gutted whiting that are to be shipped in the frozen state shall be placed in the freezer within 30 minutes after being packaged. The product shall be frozen at a freezer temperature of -10° F. or lower and then shall be maintained in storage at a temperature of 0° F. or lower.

TRANSPORTATION: Fresh whiting shall be transported in either refrigerated or nonrefrigerated vehicles. During transportation, the whiting shall be kept at temperatures not higher than 36° F. by packing the containers of whiting in boxes with ice, and re-icing enroute if necessary, or by shipping them in vehicles that have a storage space maintained at 32° to 36° F.

Frozen whiting shall be transported in refrigerated units. The refrigeration must be turned on and the temperature reduced to 0° F. or lower prior to loading, and the proper temperature of 0° F. or lower shall continuously be maintained during the entire time of shipment.

The temperature of the fresh or frozen whiting shall be measured both before and after shipment, and duly recorded. (Temperatures can be determined by using an accurate stem-type thermometer, inserting it into the center of the chilled product or at the juncture of four package units of the frozen products for several minutes until the temperature indicated by the thermometer ceases to fall, and then reading this steady lowest temperature.)



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SHAD HERALDS SPRING

On April 20, 1787, while living at his Mount Vernon estate on the Potomac River, George Washington made this entry in his diary: "The shad began to run today."

As in the time of Washington when planked shad was the fish dish for gourmets, shad is still one of the best known and most highly-prized food fish on the Atlantic Coast. Its meat is tender and whitetailed, with a distinctive flavor, and the roe is considered a great delicacy.

To the homemaker, bogged-down in a menu-rut from winter, it is good news indeed that the annual spring run of shad is on in important shad-producing streams of the Atlantic and Pacific Coasts.

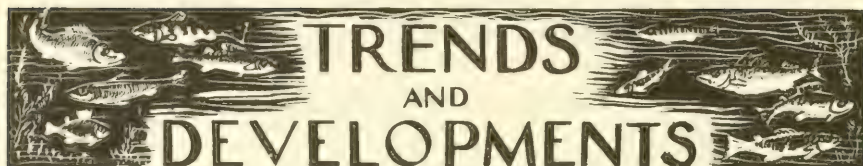
A Planked Shad Dinner--served on a hardwood plank or oven-glass platter surrounded by mashed potatoes, vegetables, and garnishes--perks up the appetite. Here is how the home economists of the U. S. Bureau of Commercial Fisheries plank a shad.

PLANKED SHAD

3 or 4 pounds dressed shad
1½ teaspoons salt
Dash pepper
¼ cup butter or other fat, melted

Seasoned mashed potatoes
Seasoned cooked vegetables
(peas, carrots, cauliflower,
tomatoes, or onions)

If hardwood plank is used, oil well and place in a cold oven to heat while oven preheats. Clean, wash, and dry fish. Sprinkle inside and out with salt and pepper. Brush with butter. Place fish on plank or well-greased oven-glass platter. Bake in a hot oven, 400° F., for 35 to 45 minutes or until fish flakes easily when tested with a fork. Remove from oven; quickly arrange border of hot mashed potatoes around fish. Place in a broiler until potatoes are slightly browned, about 5 minutes. Remove; arrange two or more hot vegetables around fish. Serves 6.



TRENDS AND DEVELOPMENTS

Fishing Vessel and Gear

Developments

EQUIPMENT NOTE NO. 3-- NEW DIVING SLED FOR UNDERWATER PHOTOGRAPHY:

To improve the effectiveness of commercial fishing gear, research units of the U. S. Bureau of Commercial Fisheries recently began an extensive series of underwater studies of gear action. Unique problems and technical difficulties have been created by the necessity for observing and recording the action of the gear under operational conditions. One of these was the lack of a suitable vehicle from which direct visual and motion picture observations could be made.

Early efforts to develop a suitable vehicle resulted in a strong lightweight diving sled of high maneuverability (Sand 1956). This sled fulfilled requirements for a vehicle from which direct observations of the gear could be made by SCUBA divers; but it was not considered fully satisfactory as a vehicle for underwater photography, because serious strains were imposed on the camera operator when making steady high-quality pictures.

To overcome that weakness, personnel assigned to the Bureau's gear research vessel George M. Bowers, at Pascagoula, Miss., recently developed and constructed a new sled specifically designed for motion picture work. Over 10,000 feet of motion picture film have been taken from the new sled since it was first put into operation, and its performance has been excellent at towing speeds of $1\frac{1}{2}$ to 3 knots.

Construction: The frame of the new sled (fig. 1) is welded throughout for safety and ruggedness. Control surfaces

have been placed at the extreme leading edge of the sled frame, and handles for regulating those surfaces are placed on the port side for operation by one diver. All control linkage is run through rubber bushings rather than metal because rubber needs no lubrication and does not "freeze." The towpoint, on the forward edge of the frame, has been set back behind the effective center of action of the control surfaces (fig. 2) to provide greater maneuverability.

A rod attachment on the camera housing can be secured in one of two camera mounts on the leading and trailing edges of the starboard runner (fig. 3). The mounts permit movement of the camera through an extensive arc, thereby permitting pictures to be taken over a wide field while relieving the cameraman of considerable strain and providing steady support.

Foam-rubber net floats laced to the upper portion of the frame and air tanks spot-welded to the runners and under the central portion of the upper frame provide buoyancy. Canvas stretched between the lower frame members supports the divers and adds to the stability of the sled (figs. 2 and 3).

Accessories and Modifications: Development of research tools is a continuous task, and the tools developed must be subjected to constant revision as new needs arise. The foregoing account described the basic structure of the sled as it was used during the operations conducted in 1959. To that basic sled several accessory structures and features have been added, for example: a rudder (figs. 1-3) was found to increase the stability of the sled in strong currents; boxes lined with foam rubber (fig. 3) were placed on the frames near the camera mounts to hold light meters; a depth gauge was

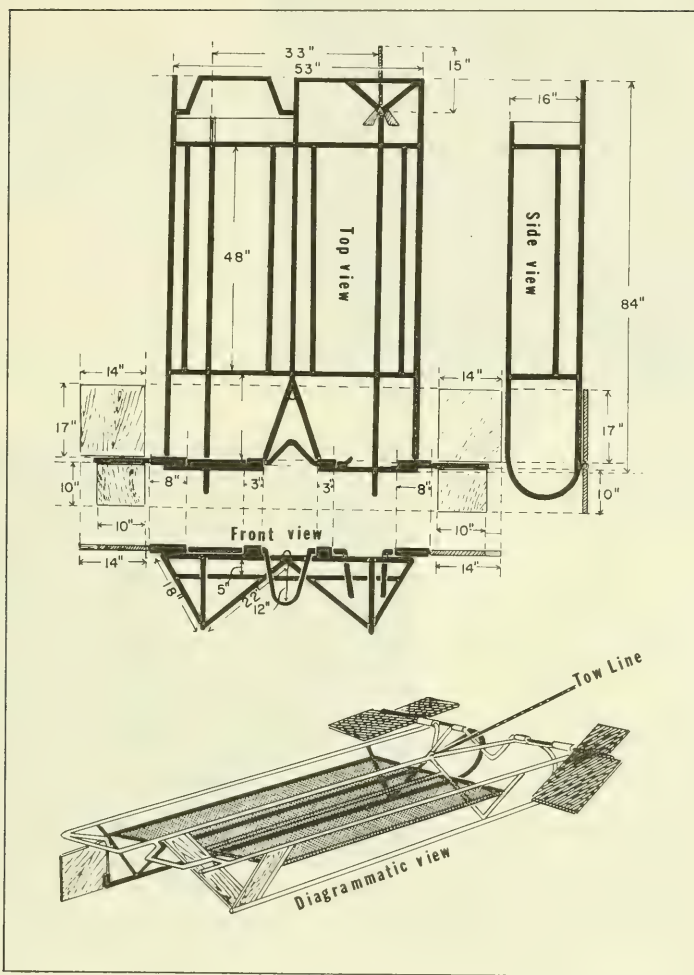


Fig. 1 - Diagrammatic views of the new sled. For clarity, only the frame is shown. All frame members are made of $\frac{3}{4}$ -inch electrical conduit. Rudder, stabilizer, and control surfaces are $\frac{3}{4}$ -inch plywood.

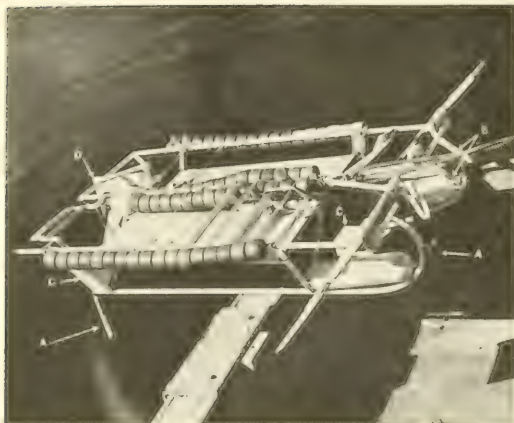
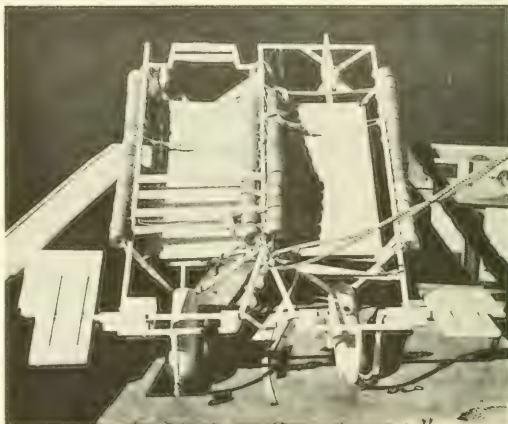


Fig. 2 - Top view of the sled. By placing the control surfaces on the leading edge of the frame and situating the tow point from one-fourth to one-third the length of the frame behind the effective center of action of the control surfaces, the sled has been made exceptionally maneuverable. A depth-indicator dial can be seen on the port flotation tank.

Fig. 3 - The sled balanced on the rail of the M/V *George M. Bowers*. (A) Camera mounts. (B) Handles for regulating port and starboard control surfaces. (C) Lined boxes for light meters. (D) Rudder.

added (fig. 2); and synthetic-fiber straps were placed across the frame to add to the comfort of the divers.

Operation: In operation the sled has proved stable and extremely maneuverable. The excellent performance characteristics of the new sled are primarily attributed to the functional relation existing between the tow point and the control surfaces, which has been accomplished by setting the tow point back. Unlike the sled previously used, the new sled permits the operators to lie in a prone position--side by side. This minimizes water resistance and promotes comfort and safety. The sled operator lies on the port side where he has full control of the movement of the sled. The photographer-observer lies beside him--facing either in the same direction or toward the after end of the sled depending on the operation and the camera mount in use.



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Alaska

KING CRAB RESEARCH AIDED BY SKIN DIVING:

Undersea ranching for controlled studies of king crabs is the latest project of the Biological Research Division of the Alaska Department of Fish and Game at Kodiak. The ocean floor is the ranch, steel framed wire-covered pens the corrals, and a skin-diving biologist the crab herder. The purpose is to gather biological information that will keep the new dollar-earning king crab industry in the Kodiak-Afognak area operating on a sustained-yield basis.

Although Department biologists have studied the king crab since 1954, successful management requires far more data on the animal's growth rates, feeding habits, migrations, and reproductive biology.

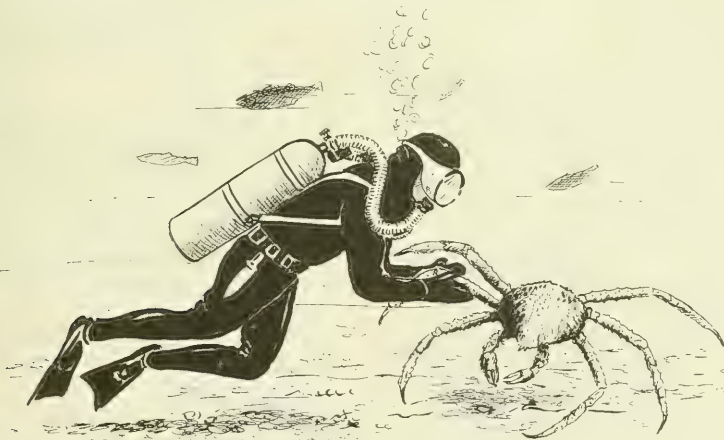
When the Alaska research biologist began his king crab research two years ago, he studied crabs by trapping them in pots and hauling them to the surface for examination. However, this was not entirely satisfactory. The biologist obtained a skin diver's suit to study the crabs in their own habitat.

As crabs are nomadic in habit, the biologist found it necessary to build pens to confine his crabs to a certain area to insure continuity to his studies. He can now observe the crabs living in their natural environment on the ocean floor. About 300 king

The suit is made of neoprene. It is known to divers as a wet suit. Although the suit fits skin tight, water seeps into the suit under the wrist and leg bands. This is gradually warmed by body heat until the diver is actually encased by a thin film of tepid water. The suit, including pants, shirt, gloves, boots, and head cap covers the body. Goggles fit over the eyes. Only the area around the mouth is exposed. It takes awhile for the exposed part of the face to grow accustomed to the cold water, although at times in the winter the water is often warmer than air. For breathing under water a 75-pound tank of compressed air is carried on the diver's back. Air is breathed through a mouthpiece attached to a hose from the tank. This will provide underwater breathing for about an hour. The tank appears heavy, but it is of course hollow and will rise buoyantly to the surface if released from the diver.

The biologist descends to tend and study his crabs at least once weekly. As the crabs cannot move out of the pens for food he must feed them. He gathers some of the food himself on the harbor floor; the rest he buys from fishermen. Sometimes 1,000 pounds is contracted for and frozen for future use. Food consists of starfish, sand dollars, sea urchins, and several kinds of bottom fish.

The Chief of the Biological Research Division for the Department who directs the king crab project along with other studies maintains that data on the entire life cycle of the king crab can be obtain-



crabs are confined in six pens that have a combined area of 600 square feet. A two-inch stainless steel wire mesh keeps the smallest crabs from crawling out and prevents outside crabs from crawling in and eating the food placed there by the diver. The pens have no bottoms so the crabs can burrow in the mud or sand just as they might in their natural state. The temperature of the water is about 38 degrees in a 20-foot depth of water at low tide. The water is colder at 50 feet, but the biologist can work quite comfortably for an hour at that depth.

ed by skin diving. He believes that skin diving should be encouraged and developed as a tool in fishery investigations.

The only time unpenned crabs can't be studied is when they go into deeper water offshore where they cannot be followed. But it is quite common, the biologist states, to observe king crabs reproducing in depths of 50 feet or less. At that time an estimate of sex ratios, vital to population counts, can be made.

Schools of herring and salmon have been observed on the sea dives. Halibut are quite wary. Squid swim away quickly, sometimes emitting an inky smoke screen in their wake.

As for king crabs, it is possible to observe any stage of their growth or activities. They don't seem to mind being watched. They can run quite fast, however, but none have been seen swimming free of the bottom. They walk "tip toe" on the ocean floor as fast or faster than a skin diver can swim.

The extent of a skin diver's observations depends upon his underwater visibility. This is determined by when and where he is diving. Sometimes visibility is good for a distance of 100 feet or poor at 20 feet. The use of an underwater compass is the only way the diver can keep his horizontal directions straight under water. He generally knows which way is up.

The biologist seldom goes down without a companion-diver as he says almost anything can happen in diving. Bleeding from the ears and nose can occur from ascending too rapidly. If the sinuses are clogged or the diver has a cold, a too rapid ascent may rupture blood vessels and cause a hemorrhage.

The biologist has made films of a king crab moulting and discarding its old shell. This was possible because he was able to observe the moulting process taking place in his undersea pens.

The only time a crustacean can increase its size is during a short period after it has shed its old shell. Comparatively little is known of king crab growth rates. After hatching, the king crab's life begins as a speck of microscopic plankton in the sea. From this almost invisible size it sometimes grows into a 24-pound specimen with a leg spread of nearly 58 inches.

No biologist is quite sure of the age male crabs become sexually mature. A female indicates arrival at maturity by the presence of eggs under her tail. Here she carries from 200,000 to 400,000 eggs. The female's sexual maturity has been roughly estimated at four years when she measures four inches across the body. A male king crab's body must measure $6\frac{1}{2}$ inches before the animal can be taken legally by a fisherman.

Picking up a large king crab, the biologist states, can be real hazardous for a diver. For that reason he never tries to handle more than one at a time under water where they are particularly active. They can tear a diver's suit apart while waving their enormous legs and claws blindly about.

Another menace to divers are killer whales. These have been captured in the vicinity of Kodiak with as many as 13 seals in their stomachs.

The biological evidence being gathered will be used for management purposes wherever king crabs are found and harvested. There is reason to believe that king crab fishing areas will be greatly extended. This year a new fishing area will be investigated in the vicinity of Pelican in Southeastern Alaska. Much of the success of managing this valuable resource by the Alaska Department of Fish and Game will be based on the type of data.

ALITAK BAY DECLARED A HISTORIC BAY:

A positive intention to maintain full jurisdiction and control over the waters of Alitak Bay (located on the southwest end of Kodiak Island) was announced on February 19, 1960, by the Alaska Department of Fish and Game. The boundary of State jurisdiction is defined as within the area encompassed by a line drawn from the southern tip of Tugidak Island to Low Cape on Kodiak Island and for three miles seaward of such a line.

The Alaska Department of Law has advised the Department of Fish and Game that there is precedent for this claim and that the State jurisdiction can be upheld.



American Fisheries

Advisory Committee

NEXT MEETING TO BE HELD IN AUGUST:

The eleventh meeting of the American Fisheries Advisory Committee will be held in Seattle, Wash., August 10-12, 1960. The executive sessions will be held on August 10 and 11.

This advisory group was created under the terms of the Saltonstall-Kennedy Act of 1954 as amended in 1956. This legislation provides that an amount equal to 30 percent of the moneys received from import duties on fishery products shall be available to the Secretary of the Interior to promote the free flow of domestically-produced fishery products in commerce.

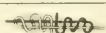


American Samoa

Species	January		February		Jan.-Feb.	
	1960	1959	1960	1959	1960	1959
	(1,000 lbs.)					
Albacore	2,550	1,989	2,254	1,138	4,804	3,127
Yellowfin	222	411	400	396	622	807
Big-eyed	63	71	88	45	151	116
Skipjack	3	-	1	1/	4	1/
Total	2,838	2,471	2,743	1,579	5,581	4,050

1/ Less than 500 pounds.

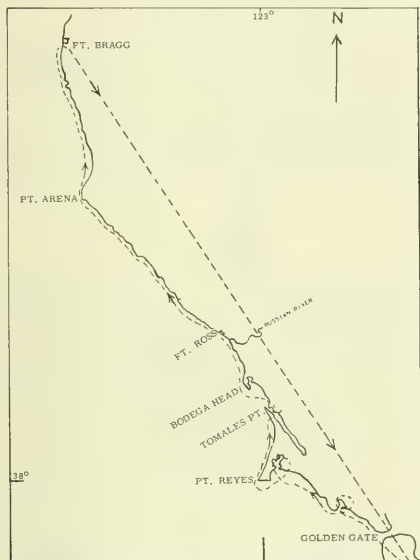
Note: Most of the tuna landed by Japanese long-line vessels; a small amount by South Korean and Samoan long-line vessels.



California

AERIAL CENSUS OF COMMERCIAL AND SPORT FISHING CONTINUED:

Airplane Spotting Flight 59-25, Abalone-Clam:
The shoreline from San Francisco to Ft. Bragg and from Pt. Buchon to Pillar Pt. was surveyed from the air on December 26-27, 1959, by the California Department of Fish and Game Cessna 182 to determine the number of abalone sport fishermen, clam diggers, and shoreside sport anglers present in the area.

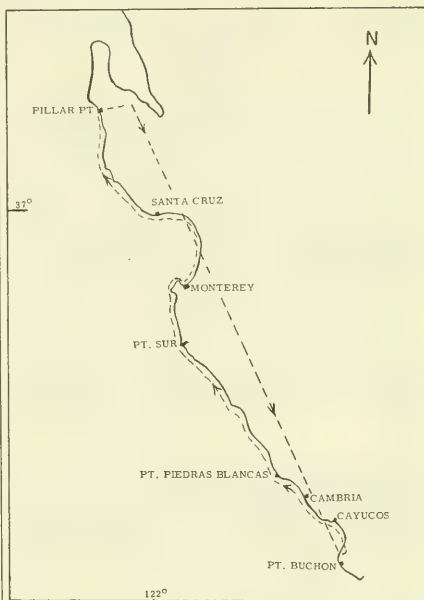


Flight 59-25 Abalone, Clam, December 26.

On December 26 the weather was better than average but there was a very heavy surf. There was almost no wind and only a scattering of high clouds. The tide was -0.5 ft. at 3 p.m.

On December 27 the weather was nearly perfect. The surf was very low, especially on the southern portion of the coast. The contrast with the previous day was remarkable. The observations were concluded at Pillar Point as a strong wind, an incoming tide, and darkness made further scouting pointless.

A skin-diving meet was in progress at Ano Nuevo and probably biases the count by adding spear fishermen to the abalone pickers in that area. Two commercial abalone diving boats were working three miles north of Pt. Piedras Blancas. On December 26 in the Golden Gate to Ft. Bragg area, 293 abalone pickers, 254 clam diggers, and 45 surf anglers were observed. In the area from Pt.



Flight 59-25 Abalone, Clam, December 27.

Buchon to Pillar Point, 605 abalone pickers, 636 clam diggers, and 74 surf anglers were observed.
Note: Also see *Commercial Fisheries Review*, February 1960, p. 29.

* * * * *

CRAB DISTRIBUTION AND ABUNDANCE STUDIES CONTINUED:

Airplane Spotting Flight 59-20-Crab: The area from Moss Landing to Fort Ross was surveyed from the air on November 16, 1959, by the California Department of Fish and Game Cessna 182 to determine fishing localities of the central California commercial crab fishery.

Although fog and haze hampered observations, 198 crab trap strings were counted. No trap strings were observed south of Half Moon Bay or north of the Russian River. The greatest concentration of set gear was off Drakes Bay, south of Pt. Reyes. Lesser concentrations were off the Russian River and Sharps Park.

Airplane Spotting Flight 59-24-Crab: The coastal waters from Monterey to Oregon were surveyed from the air (December 20-22, 1959) to determine the fishing locations and relative density of the northern California crab fishery.

Sea and weather conditions were good between Monterey and Oregon, 261 lines of traps were

counted. They were distributed as follows: 176 north of Point Arena; 85 between Point Arena and Monterey Bay. The heaviest concentrations appeared between Cape Mendocino and the Klamath River where 136 were tallied.

Aerial observation indicates a reduction in settings in the traditional grounds of the San Francisco area and an increased concentration of gear in the Monterey Bay vicinity. While traps were observed in all depths, the majority of settings were in deep water.

Airplane Spotting Flight 60-1-Crab: The commercial crab fishing areas from Monterey to Pt. Reyes were surveyed from the air on January 6, 1960, to determine the fishing localities and relative density of crab gear of the central California crab fleet.

This flight was originally scheduled to include three days of flying time to survey the crab fishing areas from Monterey to the California-Oregon border. Bad weather limited the survey to one day and survey of the area between Monterey and Pt. Reyes. Visibility was excellent during the day of the survey.

Eighty-nine lines of crab gear were counted within the survey area. About one-half of these were in an area five to eight miles offshore, between Pt. Reyes and Bolinas Bay. Concentrations of lesser magnitude were observed northeast of Pt. San Pedro (16), Half Moon Bay (6) and Moss Landing (14).

Fourteen whales, thought to be California grays, were observed: two off Pt. Reyes, one south of Drakes Bay, seven near the South Farallons, two near Half Moon Bay, and two off the Monterey peninsula.

Note: Also see *Commercial Fisheries Review*, April 1960, p. 18.

* * * * *

SHRIMP LANDINGS

BREAK RECORD IN 1959:

Landings in California of ocean shrimp set another record in 1959, according to the Director of the Department of Fish and Game. The ocean shrimp catch for 1959 totaled 1,777,874 pounds, an increase of 47,652 pounds over 1958, which was itself a record year.

The higher landings in 1959 were made possible when the Fish and Game Commission accepted Departmental recommendations to increase quotas in two areas. The quota was raised 250,000 pounds in Area A--Oregon line to Cape Mendocino--and by 200,000 pounds for Area B-1, off Fort Bragg.

The catch was largest in Area A, with California landings of 1,317,972 pounds, plus about 400,000 pounds landed in Oregon.

The Area A California shrimp fleet, which ranged from three vessels in May to 10 in July 1959, made over 1,000 tows, totaling more than 2,000 fishing hours. The average catch per fishing hour for the entire season was 638 pounds last year, which compares favorably with shrimp fishing anywhere in the world. The 1958 average was 501 pounds.

Virtually no shrimp catch came from Area B-2 in 1959. This area is from Point Arena to Pigeon Point.

Area C, Pigeon Point to Conception, produced just under 15,000 pounds of ocean shrimp in 1959. The shrimp were scarce and weather rough. The average catch per fishing hour in this area in 1959 was 106 pounds as compared to 256 pounds in 1958.



Canned Fish

DISTRIBUTION OF CANNED TUNA, SALMON, AND SARDINES:

A shipper survey of canned tuna, salmon, and sardines was recently finished by the U. S. Bureau of the Census for the U. S. Bureau of Commercial Fisheries. The purpose was to obtain data on the (1)



geographic location of the market; (2) the commodities that are moving, including number of cases by can size and type, and the class of customer; (3) how much of the pack moves into the multi-unit retail food channel, how much into Government, and how much into all other channels. The data are based on shipments in the 12 months ended June 30, 1959.

The study shows that about 23 million standard cases of canned fish were shipped during the twelve months. Canned tuna comprised more than half of the

total--about 13 million cases. Shipments of canned salmon and sardines accounted for 5 million cases each.

Distribution of canned tuna and sardines was largest in the Pacific region, accounting for 27 percent and 16 percent of total shipments, respectively. California received the largest proportion of both canned tuna and canned sardine shipments, which eventually are further distributed. Distribution appeared largest in this region because there is a movement from canner to warehouses in the case of tuna and sardines, and for export from California for sardines.

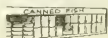
The East North Central Region--Ohio, Indiana, Illinois, Michigan, and Wisconsin--received 23 percent of total shipments of canned salmon. On the West Coast, Washington received 13 percent of total shipments.

Chunk-style tuna accounted for 61 percent of total tuna shipments. The one-half pound can pack represented 85 percent of tuna shipments. About 39 percent of total tuna pack moved into multi-unit retail food channels, 3 percent channeled through Government, and 58 percent into all other channels.

Red and pink salmon, in almost equal amounts, comprised about 67 percent of total salmon shipments. The one pound can was the most popular pack for salmon, representing 65 percent of distribution. The multi-unit purchasers distributed 23 percent of canned salmon, with only 1 percent channeled through Government and 76 percent into all other channels.

The distribution of sardines by style of pack was 38 percent oil pack, 24 percent tomato sauce, 6 percent mustard, and the remainder unidentified. Keyless sardines accounted for 93 percent of all sardine shipments; 56 percent packed in one pound cans. All sardines packed with key were distributed in the $\frac{1}{4}$ -pound can sizes, with oil pack accounting for two-thirds. About 17 percent of all canned sardines were distributed through multi-unit retail outlets, 1 percent through Government, and the remainder through other channels.

Note: Also see *Commercial Fisheries Review*, January 1960, p. 40



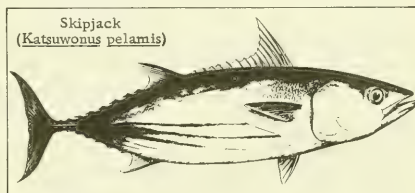
Central Pacific Fisheries

Investigations

SKIPJACK TUNA HELD IN CAPTIVITY SUCCESSFULLY:

Oceanic skipjack tuna (*Katsuwonus pelamis*) were successfully introduced during February 1960 into a pool at the Honolulu (Kewalo-Basin) Biological Laboratory, of the U. S. Bureau of Commercial Fisheries, and are feeding in captivity. Although black skipjack and yellowfin-tuna have been held in captivity for varying periods of time, this is the first time that oceanic skipjack have been so held for more than a few hours or have been induced to feed.

The major portion of this success is attributed to the elimination of manual



handling of the fish. Transportation of the fish from the ocean to the pool was accomplished in such a way that the skipjack were only out of water momentarily and were touched only by a barbless hook. A portable steel, oval tank, 8 by 6 feet and approximately 2 feet deep, was secured to the deck of a chartered commercial live-bait vessel. When the skipjack were hooked, the fishermen lowered the fish into the tank with enough slack in the line to allow the fish to shake off the hook. During transport, water was continually circulated within the tank. When the vessel reached shore, the tank was lifted from the ship and immersed in the pool. A hatch in the side of the tank was opened and the skipjack were allowed to swim out of the tank into the pool.

The pool is circular, 23 feet in diameter and 4 feet deep. Pumps are arranged so that sea water from an adjacent channel or saline water from a well can be pumped into the pool. As water from the well is devoid of oxygen, it is allowed to cascade down a special aerator before flowing into the pool.

The only food that has been fed to the skipjack thus far has been chunks of shrimp, which have been purchased frozen from commercial sources.

With this significant advance in the Bureau's skipjack tuna behavior studies, plans are being made for the construction of more suitable tanks and associated instrumentation in which skipjack behavior may be observed. It is planned that conditioned response studies will be undertaken. These studies will involve variables which cannot readily be controlled at sea such as sound, light, and various extracts including fish blood, visceral extracts, etc., and will supplement those made at sea from the underwater observation chambers on the Bureau's research vessel Charles H. Gilbert.



Charts

NEW EDITION OF ISOAGONIC CHART OF U. S.:

The new edition for 1960 of Isogonic Chart No. 3077 of the United States, with the States of Alaska and Hawaii included for the first time, has just been published, the Director of the Coast and Geodetic Survey announced on March 10, 1960.

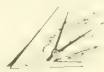
The chart is issued in a new format with the 48 states shown on one side of a single sheet, printed back-to-back with the new States of Alaska and Hawaii. These charts show the distribution of magnetic declination or variation of the compass (the angle between true north and magnetic north) and rates of annual change for the entire Nation. The iso-lines connect points of equal magnetic declination and of equal annual-change rates. The 1960 edition of Chart No. 3077 supersedes the preceding edition published in 1955. Chart 3069b, Isogonic Chart of Alaska for 1955, is obsolete and will not be reissued, for Alaska is now shown on the United States chart.

The chart of Alaska includes western Canada, northwestern United States, and the eastern tip of Siberia. It is at the scale of 1:5,000,000 on the Lambert conformal cone projection, corresponding to the projection and scale of the reverse side showing the 48 states. The State of Hawaii is shown on the Alaska side of the chart at the scale of 1:7,500,000. The lines of equal declination and equal annual change have been completely redrawn for the new charts from the latest available information.

The isogonic lines are derived from the Coast and Geodetic Survey's extensive file of world-wide geomagnetic data. These same data were used earlier by the Bureau in compiling the U.S. Navy Hydrographic Office World charts showing the world-

wide magnetic variation for the 1960 epoch. The charts for the United States show the general pattern indicated on the series of world charts, but in greater detail made possible by the greater density of magnetic observations in continental areas. Isogonic lines in Canadian areas were furnished by the Dominion Observatory, Department of Mines and Technical Surveys, Ottawa.

These charts are the latest of a long series of magnetic charts published by the Coast and Geodetic Survey as a navigational aid and for other scientific and engineering purposes. The isogonic charts are of particular interest to the navigator, surveyor, prospector, and scientist. Magnetic information in the form of compass roses and isogonic lines appearing on nautical and aeronautical charts of the United States published by the Coast and Geodetic Survey is based on the isogonic charts. The charts may be used for quick and accurate determination of declination by simple inspection without measurement of any kind.



Chesapeake Bay States

MONTHLY FISH LANDING BULLETINS FOR MARYLAND AND VIRGINIA:

Two new monthly bulletins showing the landings of fish and shellfish in Maryland and Virginia ports will henceforth be issued by the U. S. Bureau of

MARYLAND LANDINGS

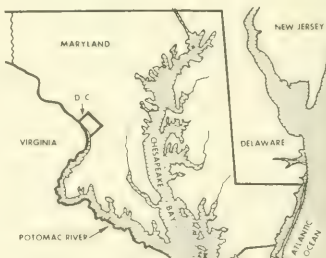
U. S. Department of the Interior
Fish and Wildlife Service
Bureau of Commercial Fisheries
Washington 25, D. C.

Maryland
Department of Tidewater Fisheries
and
Department of Research and Education
Annapolis, Md.

C. F. S. NO. 2242

JAN. 1961

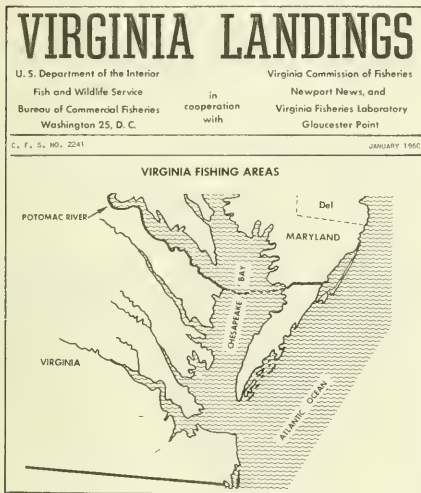
MARYLAND FISHING AREAS



Commercial Fisheries in cooperation with the fishery agencies of the two States. The first issue of each report has been issued and each covers the landings in each of those States during January.

Virginia data are obtained in cooperation with the Virginia Commissioner of Fisheries and the Virginia Fisheries Laboratory. The Maryland information is obtained through the Maryland Department of Tidewater Fisheries and the Department of Research and Education.

The addition of these two bulletins brings to 17 the number of monthly landings bulletins issued by the Bureau in cooperation with the respective States.



All of these are for coastal states except for the Ohio bulletin which covers the landings of that State from Lake Erie.

The other states for which monthly landings publications are available are Maine, Massachusetts, Rhode Island, New York, New Jersey, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, California, and Ohio.

Over half of the Atlantic Ocean-Gulf of Mexico harvest of blue crabs and nearly 70 percent of the eastern oysters are landed in the Chesapeake Bay States of Maryland and Virginia.



Federal Purchases of

Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-FEBRUARY 1960:

Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Department of Defense, 1.8 million pounds (value \$912,000) of fresh and fro-

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, February 1960 with Comparisons

QUANTITY		VALUE	
February	Jan.-Feb.	February	Jan.-Feb.
1960	1959	1960	1959
1,817	1,437	3,314	2,296
912	777	1,649	1,621

zen fishery products, were purchased in February 1960 by the Military Subsistence Supply Agency. This exceeded the quantity purchased in January by 21.4 percent and was 26.4 percent above the amount purchased in February 1959. The value of the purchases in February 1960 was higher by 23.7 percent as compared with January and 17.4 percent above February 1959.

During the first two months of 1960 purchases totaled 3.3 million pounds (valued at \$1,649,000)--an increase of 13.3 percent in quantity and 1.7 percent in value as compared with the similar period in 1959.

Prices paid for fresh and frozen fishery products by the Department of Defense in February 1960 averaged 50.2 cents a pound, 1.0 cent higher than the 49.2 cents paid in January, but 3.4 cents less than the 53.6 cents paid during February 1959.

Canned Fishery Products: Tuna was the principal canned fishery product pur-

Table 2 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, February 1960 with Comparisons

Product	QUANTITY		VALUE	
	February	Jan.-Feb.	February	Jan.-Feb.
	1960	1959	1960	1959
1,000 Lbs.	566	368	1,017	753
260	189	451	381	
25	25	31	37	10
9				14
13				

chased for the use of the Armed Forces during February this year. In the first two months of 1960, purchases of canned tuna were up 35.1 percent, but for canned sardines were down by 16.2 percent as compared with the same period in 1959.

No canned salmon was purchased during January-February 1960 and 1959.

Note: Armed Forces installations make some local purchases not included in the data given; actual total purchases are higher than shown because local purchases are not obtainable.



Fisheries Loan Fund

LOANS APPROVED, JANUARY 1-FEBRUARY 29, 1960:

As of February 29, 1960, a total of 707 applications for fisheries loans totaling \$21,959,268 had been received since the program was started in December 1956. Of these, 372 (\$8,663,534) have been approved, 239 (\$6,860,774) have been declined or found ineligible, 56 (\$2,499,156) have been withdrawn by applicants before being processed, and 40 (\$2,902,729) are pending. Several of the pending cases have been deferred indefinitely at the request of the applicants. Sufficient funds are available to process new applications when received.

The following loans had been approved between January 1 and February 29, 1960:

New England Area: Sofus Martensen, New Bedford, Mass., \$71,600.

South Atlantic and Gulf Area: Edly B. Shipman, New Smyrna Beach, Fla., \$6,500; Elroy Leonard, Charlotte, N. C., \$19,500; Albin W. Gerds, Brownsville, Tex., \$7,400; and Ralph J. White, Brownsville, Tex., \$40,500.

California: Earl E. Harvey, Eureka, \$9,500; Frank P. LaGamma, Lemon Grove, \$17,000; Donald L. Sawyer, San Diego, \$7,645; and John Sima and Tony Zangaro, San Pedro, \$28,900.

Pacific Northwest Area: Arthur H. Paquet, Astoria, Oreg., \$20,548; Louis S. Mattocks, Seaside, Oreg., \$10,000; Humphrey L. Tyrone, Marysville, Wash., \$6,550; Michael Nicpon, Port Angeles, Wash., \$4,500; Boat Sea Star, Seattle, Wash., \$39,296; and Reuben Troberg, Seattle, Wash., \$2,000.

Alaska: William A. Eklof, Homer, \$8,000; and Gerald G. Bennett, Ketchikan, \$8,000.



Frozen Foods

PACKERS CLARIFY THEIR POSITION ON FROZEN FOOD CODE:

At its annual meeting in mid-March 1960 the Board of Directors of the National Association of Frozen Food Packers (NAFFP), whose membership includes nearly 85 percent of the industry



producers, acted to clarify its position on the frozen food code of the Association of Food and Drug Officials of the United States (AFDOUS) by adopting the following resolutions:

1. That NAFFP has long recognized the desirability of achieving the goal of a uniform temperature of 0° F. for the commercial handling of frozen foods, and continues to approve that goal. This goal should be achieved in a reasonable and practicable manner with recognition of the responsibility of industry to continue to make available to the public, adequate supplies of sound and wholesome frozen foods. It is not consistent with the fulfillment of this responsibility to establish an absolute product temperature of 0° F., since, within reasonable limits, temporary deviations from the zero level will not affect the soundness of wholesomeness of such foods;

2. That the membership be invited to channel matters of compliance with bacterial and temperature specifications in the State of Massachusetts, or in other states or municipalities, through the headquarters office so that such matters can be dealt with on a unified basis. Assistance on such matters may be offered to nonmembers if it appears that to do so would be in the interest of the industry.

3. That it is the view of NAFFP that the AFDOUS Code should be considered as a manual of operating practices and objectives; that it should not be proposed for adoption as statute or regulation. Its provisions do not lend themselves to en-

forcement as statutory enactments of regulations with criminal penalties for their violation. They may provide, however, the basis for obtaining the common objectives of both industry and the Association of Food and Drug Officials of the United States, which are stated in this resolution.



Gulf Exploratory Fishery Program

MIDWATER TRAWLING FOR SCHOOL FISH IN THE GULF OF MEXICO CONTINUED:

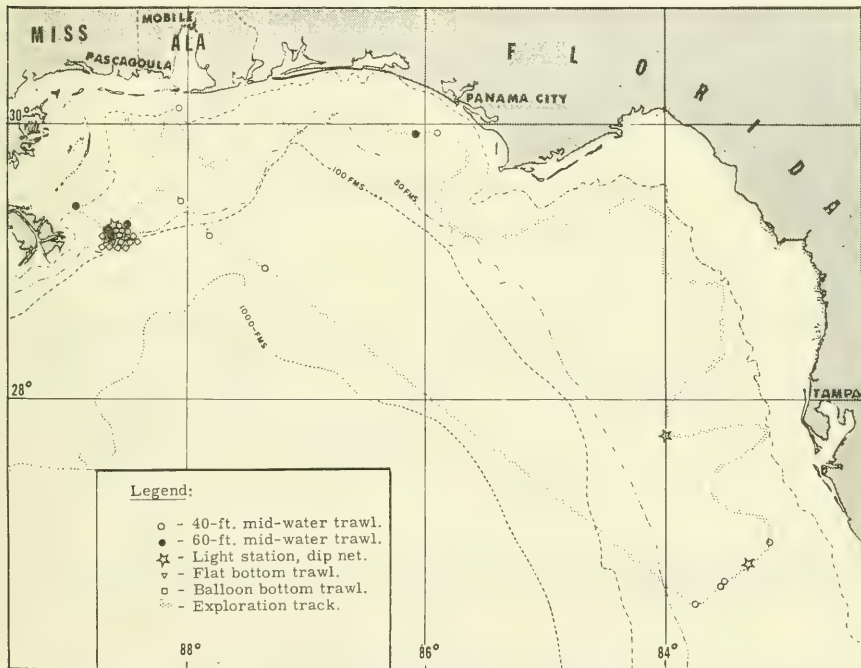
M/V "Oregon" Cruise 63: First successful commercial-scale mid-water trawling in the Gulf area was accomplished by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon (November 18-December 16, 1959) when catches of 3,000 to 5,000 pounds of bumpers (*Chloroscombrus*)

were made from mid-water depth recorder indications of fish schools.

Underwater observations and motion pictures were made of the 40- and 65-foot square midwater trawls that have been previously used in the Gulf project. Several defective performance features were noted, which summarily resulted in poor horizontal spread of the net. Unequal stresses on the hangings along the wings and body and insufficient door spread appeared to be the principal malfunctions. Vertical opening was satisfactory.

The trawls were rehung and 5-foot by 10-foot rectangular doors were constructed. After some modifications to the door bridles, a notable increase in horizontal spread was observed.

Scouting transsects were made. Concentrations of midwater fish were not



M/V Oregon Cruise 63 (November 18 to December 16, 1959).

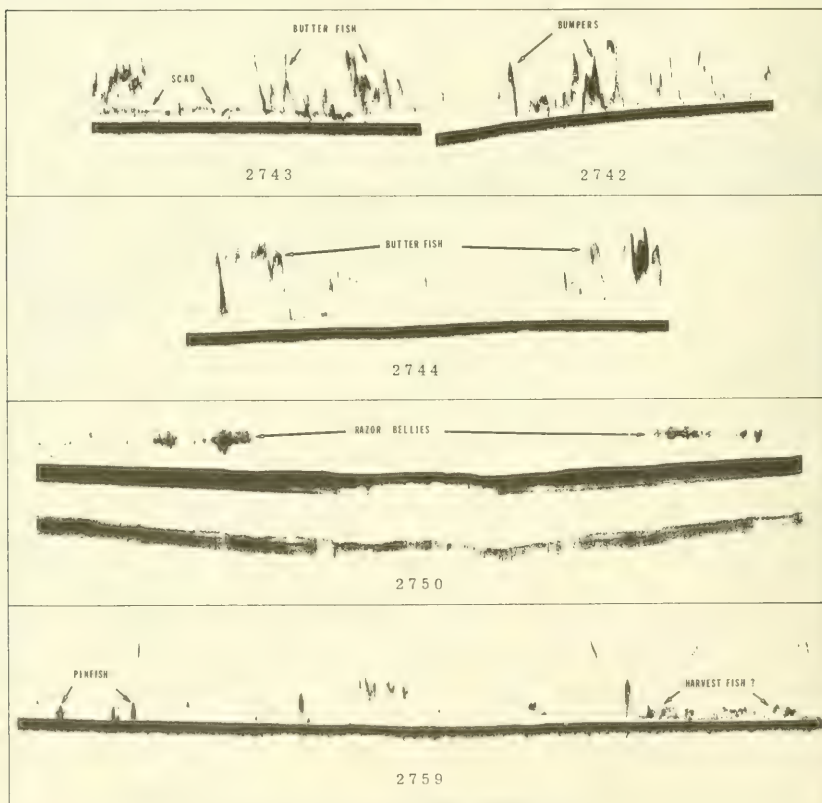
found until the vessel traversed the 40-fathom curve, east of the Mississippi Delta, where test fishing in rough seas yielded clean catches of 4" to 8" bumpers of 3,000 to 5,000 pounds per hour tow, using the 65-foot midwater trawl. A few menhaden were mixed in the catches. The sets were made on heavy recorder tracings in depths of 30 to 35 fathoms where bottom depths varied between 39 and 41 fathoms. Malfunctioning of the trawl-depth telemeter at this time allowed only approximate positioning of the trawl in the schools.

Bottom trawling with shrimp trawls was conducted in the same area "under"

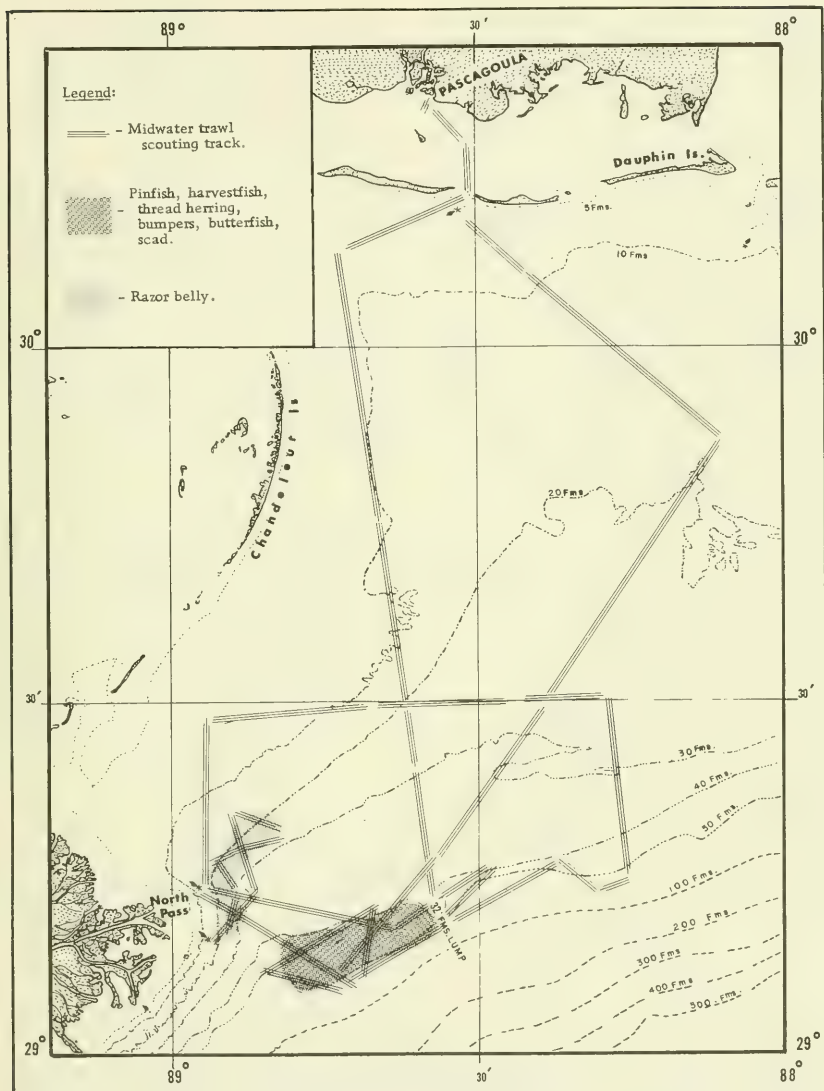
the recorder indications and the catches were devoid of bumpers and menhaden.

Nightlight dip-netting in the area yielded several 6" to 8" menhaden. Numerous small scattered schools of mullet were observed around the vessel during the night.

M/V "Oregon" Cruise 65: During March 3-10, the M/V Oregon continued midwater trawling operations for industrial and food fishes in the north central Gulf of Mexico to obtain additional information on seasonal occurrence and availability of fish stocks to midwater trawling gear.



Echo-grams made during M/V Oregon Cruise 65.

M/V Oregon Cruise 65 (March 3-10, 1960).

Scouting transects were made between the 5- and 60-fathom curves. Concentrations of midwater fish schools were located between the 40- and 50-fathom curves from 29°12' north latitude, 88°34' west longitude (32-fathom lump), west to the Mississippi Delta and along the 20-fathom contour east of North Pass.

Twenty-three tows were completed on moderate to heavy depth-recorder indications of midwater fish schools. Catches were comprised of bumpers (*Chloroscombrus chrysurus*), thread herring (*Opisthonema oglinum*), scad (*Decapterus* sp.), pinfish (*Lagodon rhomboides*), razorbellies (*Harengula pensacolatae*), butterfish (*Poronotus triacanthus*), and harvestfish or star butters (*Peprilus alepidotus*). The best individual tow contained 3½ tons of mixed harvest and pinfish. Six tows produced no catch although made on fairly heavy depth-recorder indications. Either these fish evaded the trawl or the gear was improperly positioned when the vessel passed over the school. Correlations of recorder indications with trawl catches indicate some mixed schooling of these species in most of the areas fished. An exception was in the area east of North Pass where the catch was comprised solely of razorbellies.

A sixty-foot-square nylon midwater trawl, with mesh sizes tapering from 5 inches in the wing to 2 inches in the bag, was used during the fishing trials. The bottom bosom was extended 20 feet into the wings (inverted top square) to form a projecting barrier to sounding fish. This appears to have some merit as midwater catches have increased considerably following its use. Rectangular doors, 10 x 5 feet, were used to spread the trawl horizontally. Vertical opening was maintained through the use of 23 7-inch "up-thruster" aluminum floats strung along the headrope and approximately 35 pounds of chain and two depressors attached to the footrope. Vertical positioning of the trawl was accomplished by varying engine r.p.m.'s and the scope of the towing warps. A direct-reading telemeter provided accurate readings of the depth level of the doors. Varying the engine r.p.m.'s provided satisfactory positioning within a

5-fathom range. For greater range it was necessary to adjust the towing warp scope. Some correlation was possible between depth of doors, depth of schools, and catch, and this indicated that the trawl normally fished some distance above the doors.

Attempts to raise fish to the surface at night by the use of mercury-vapor and underwater lights were uniformly unsuccessful which might have been due to the subnormal surface temperatures (45°-50° F.) encountered throughout the areas fished.

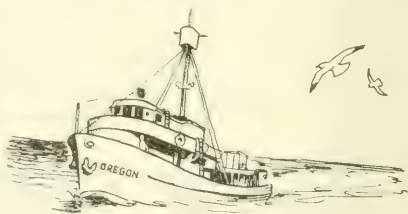
Samples of the various species taken were preserved and frozen for further study by Pascagoula laboratory technologists and biologists.

Note: Also see *Commercial Fisheries Review*, November 1959, p. 38, July 1959, pp. 34-36.

* * * * *

LAMPARA SEINE TESTS ON FISH CONTINUED OFF WEST COAST OF FLORIDA:

M/V "Oregon" Cruise 64: To obtain additional data on lampara seining of fish schools, the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon conducted further tests during a 26-day cruise (January 19-February 16, 1960) off the west coast of Florida.



Adverse weather conditions persisted throughout the cruise. High winds and seas coupled with subnormal surface water temperatures greatly curtailed fishing activities. Apparently the surface schooling habits of herring-like fish were affected by the thermogradient as bottom temperatures were found to be consistently warmer than surface temperatures throughout the areas fished. This condition may account for the fact that no surface schools were sighted during the cruise.

Two lampara seine sets were attempted on subsurface concentration of thread herring which were located by aerial spotting. Neither set produced significant catches though the aerial spotter reported the fish completely entrapped when the wings were brought aboard the purse boat. Indications were that the fish escaped through the wing meshes and the head of the seine.

Both mercury-vapor and incandescent lamps were used as fish attractors during the scoop-lift net trials. The mercury lights appeared to be considerably more effective than the incandescent lights. The limited trials with the scoop-lift net suggest that this gear may be a practical tool for the capture of sardine-like fishes in the Gulf of Mexico. Further tests are planned for this gear under more favorable operating conditions.

Of particular interest was the attraction of crabs to the mercury lights. On one occasion, hundreds of "Jack Rochester" crabs (*Portunus* sp.) were taken in the scoop-lift net. Blue crabs (*Callinectes* sp.) in amounts up to one-half bushel were common in most scoop-lift net sets completed in shallow water. The following species of fish were attracted to the lights and were taken in small quantities with the scoop-lift net: thread herring (*Opisthonema* sp.), razorbelly (*Harengulac* sp.), Spanish sardine (*Sardinella* sp.), anchovies (*Anchoa* sp.), and menhaden (*Brevoortia* sp.).

Note: Also see Commercial Fisheries Review, November 1959, p. 39.



Hawaii

COMMERCIAL FISHERIES LANDINGS, 1959:

The commercial fisheries landings of sea and pond fish and shellfish in the State of Hawaii during the calendar year 1959 amounted to 16.6 million pounds, valued at \$3.2 million ex-vessel, according to the Hawaiian Division of Fish and Game. As compared with the previous calendar year, the catch showed an increase of 5.2 million pounds, or 45.9 percent in volume, and \$546,881, or 20.8 percent, in value. The increase is largely due to the skipjack tuna (*Katsuwonus*

pelamis) catch which increased 5.6 million pounds, or 81.6 percent in volume, and \$575,833, or 64 percent in value. In addition to skipjack tuna, landings of other important species which increased substantially were yellowfin tuna (*Neothunnus macropterus*) by 160,636 pounds, or 39.4 percent, and black marlin (*Makaira* *ampla*) by 131,118 pounds, or 43.1 per-

English Name	Hawaiian Name	1958		1959	
		Quantity 1,000 Lbs.	Value US\$ 1,000	Quantity 1,000 Lbs.	Value US\$ 1,000
Ocean Catch:					
Amberjack	Kahala	79	23	89	23
Big-eyed scad	Akule	156	125	179	123
Dolphin	Mahimahi	119	33	149	58
Goatfish	Weke-ula	127	78	141	82
	Weke				
	Moana				
	Kumu				
Crevasses	Ulu	63	29	98	36
	Omolu				
Mackerel	Opelu	192	76	188	79
Shoppers:					
Gray	Uku	46	22	74	31
Pink	Opakapaka	110	56	141	67
	Kalekale				
Red	Ulaulu koa	73	65	89	68
	Ulaulu (lehu)				
Swordfishes, sailfishes, spearfishes, & marlins	A'u & A'u lepe	797	200	725	164
Pom & tunalike fish:					
Albacore	Ahupala	11	2	16	4
Big-eyed & bluefin	Ahi	1,322	574	1,556	622
Yellowfin	Ahi	569	178	408	117
Skipjack	Aku	12,413	1,475	6,835	899
Bonito	Kawakawa	12	4	42	7
Shellfish:					
Crabs	Kona, Kaukonu	8	4	8	2
Limpet	Opili	13	5	10	4
Lobster, spiny	Ulu	12	8	9	6
Octopus	Hee	4	3	3	4
Shrimp	Opae	5	-	1	1
Squid	Muhue	5	2	25	6
Other fish & shellfish		245	119	435	182
Total Ocean Catch		16,484	3,121	11,258	2,563
Pond Catch:					
Cling	Olepe	3	1	4	1
Crabs	Kaukonu, Papai	2	1	2	1
Milkfish	Awa	32	13	16	9
Mullet	Amama	45	37	57	47
Tilapia	-	2	1	5	1
Other species		12	5	11	5
Total Pond Catch		96	58	95	63
Grand Total		16,580	3,179	11,351	2,626

cent. Landings dropped for big-eyed tuna (*Parathunnus sibi*) by 274,155 pounds, or 17.2 percent, striped marlin (*Makaira audax*) by 55,280 pounds, or 15.9 percent, pink snappers (*Pristipomoides microlepis*) by 33,345 pounds, or 27.4 percent, and big-eyed scad (*Trachurops crumenophthalmus*) by 23,008 pounds, or 12.9 percent.

Note: See Commercial Fisheries Review, June 1959, p. 37.



Michigan

REGULATION OF COMMERCIAL FISHERIES NOW RESPONSIBILITY OF CONSERVATION COMMISSION:

Beginning March 19, 1960, regulation of Michigan's commercial fishing industry becomes a responsibility of that State's Conservation Commission. This involves about 1,000 licensed operators

and some 39,000 square miles of Great Lakes waters--nearly twice the combined area of the seven other Great Lakes States. Under its new authority, the Commission will be empowered to adjust regulations with the exception of license fees and penalties.

Department of Conservation officials will study suggested changes concerning mesh sizes, seasons, size limits, and other matters. No quick or marked changes in present regulations are foreseen, however.

The shift in control from the State Legislature to the Commission is designed to create closer contact between the industry and its governing body. Previously, the Commission's power was piecemeal. It was charged with enforcing regulations, licensing fishermen, collecting spawn, and compiling statistics, including daily catch records of licensed fishermen.

Department leaders view the new arrangement as particularly important in setting uniform regulations with other states and Ontario. Control of sea lamprey and rehabilitation of lake trout in the Great Lakes will be important concerns.

During 1959, Michigan's commercial fishery operators netted approximately 21 million pounds of fish for a vessel value of almost \$3 million. The lake trout catch totaled 658,000 pounds, all of which was taken in Lake Superior. Because of the lamprey's predation, lake trout production in the other lakes is nil and even in Lake Superior spawning stock has been all but eliminated by the predator.



North Atlantic Fisheries

Exploration and Gear Research

DEEP-WATER RED CRAB TRAWLING EXPLORATIONS CONTINUED:

M/V "Delaware" Cruise 60-2 (February 11-28, 1960): This cruise was made by the U. S. Bureau of Commercial Fisheries research and exploratory

fishing vessel Delaware in cooperation with the Bureau's Fisheries Biological Laboratory, Woods Hole, Mass. The purpose of the cruise was threefold: (1) to complete hydrographic transects from the continental shelf to the Gulf Stream in the area between Georges Bank and Cape Hatteras, (2) to further investigate the distribution and availability to trawling gear of red crabs along the edge of the continental shelf bordering the mid-Atlantic area (February 21-25), and (3) to conduct trawling operations along a series of transects between Cape Hatteras and Martha's Vineyard.



M/V Delaware Cruise 60-2 (February 11-28, 1960).

Deep-water trawl explorations east of Ocean City, Md., indicated concentrations of red crabs (*Geryon quinque-dens*) were reduced at this season of the year, when compared with fishing results obtained at the same location during the summer season.

The largest individual catch taken on the cruise was 89 crabs, weighing approximately 125 pounds, during a 30-minute tow in 250-fathom depth with a standard No. 36 net. No red crabs were found to occur in depths of less than 100 fathoms. The result of tows made at intermediate depths between 90-250 fathoms indicated that except for an occasional stray, the inshore limit of the red crab depth-range at this season is approximately 130 fathoms in the area studied.

The cruise was harassed by bad weather which hampered operations during all phases. However, the coverage of red crab explorations was extended northward from Cape May (northern limit of

previous work) to the Hudson Canyon. The continental slope in the area worked is extremely broken and precipitous, and depth contours were difficult to follow with trawl gear.

A standard No. 36 otter trawl (60' foot rope, 80' head rope) was used on all exploratory tows. Conclusive work in depths exceeding 250 fathoms was impractical due to inadequacy of the electronic equipment.

Note: Also see Commercial Fisheries Review, September 1959, p. 37.

* * * * *

NEW ENGLAND COMMERCIAL BLUEFIN TUNA PURSE- SEINING, 1959 SEASON:

Commercial-scale purse-seining for bluefin tuna in the waters of the Gulf of Maine in the North Atlantic was continued in 1959 by the converted commercial trawler Silver Mink with limited assistance from the U. S. Bureau of Commercial Fisheries exploratory fishing staff at Gloucester, Mass.

Catch of the Tuna Seiner <u>Silver Mink</u> , 1959		
1959	Number of Fish	Weight Lbs.
Aug. 3	722	102,420
9	461	64,730
12	225	30,880
15	696	92,770
20	1,943	261,459
21	342	45,220
23	930	124,551
24	509	65,395
26	631	83,952
27	951	117,116
31	367	46,614
Sept. 3	600	76,350
4	515	62,800
5	568	68,880
7	286	37,670
8	206	27,450
10	356	44,575
11	672	85,900
12	150	20,220
15	158	21,900
24	289	33,980
Totals ..	11,577	1,514,832
Note: Average weight of individual fish, 130.8 lbs.		

Over 750 tons of bluefin were seined during the 1959 season which extended from August 3 to September 24, and in-

cluded 21 fishing (operational) days. The catch of tuna landed by the Silver Mink during this period surpassed the 1958 catch by 570 tons. The majority of the seining operations which produced this catch were carried on within a radius of less than 25 miles from Provincetown, Mass.--the home port of the Silver Mink.

Note: Also see Commercial Fisheries Review, February 1959, p. 1.



North Atlantic Fishery Investigations

GULF STREAM INFLUENCE ON FISH DISTRIBUTION AND ABUNDANCE ALONG CONTINENTAL SHELF:

M/V "Delaware" Cruise 60-2 (February 10-26, 1960): A cruise was made by the U. S. Bureau of Commercial Fisheries research vessel Delaware to investigate the influence of the Gulf Stream (slope water and shelf water) on the distribution and abundance of marine fish and invertebrates along the continental shelf and from Cape Hatteras to Martha's Vineyard.



The Service's research vessel, Delaware.

A partial hydrographic transect was made from Cape Ann, Mass., to the Gulf Stream by biologists from the Bureau's Woods Hole Biological Laboratory. Fishing operations were conducted at various depths from 40 to 250 fathoms from the Winter Quarter Lightship, Five Fathom Lightship, and Barnegat Lightship.

Inclement weather throughout most of the cruise hampered the completion of all objectives. A total of 32 species was caught and several species brought back to the Laboratory for further identification. The data collected showed that the hakes (silver hake, American hake, white hake, red hake, and long-finned hake) were the most abundant species caught.

This cruise was executed in three phases. The first and third were on biological objectives, and the second phase was devoted to exploratory fishing for red crab (see p. 26 of this issue).

* * * * *

FISHING SURVEY OF CONTINENTAL SHELF ALONG GEORGES BANK:

M/V "Delaware" Cruise 60-3: A fishing survey of the continental shelf was conducted (March 9-17, 1960) by the U. S. Bureau of Commercial Fisheries research vessel Delaware along the eastern side of Georges Bank. The secondary purpose of the trip was to determine the vertical movements of the whiting or silver hake and American or white hake.

Three transects of six stations, each commencing 5 miles north of Corsair Canyon to Channel, and one transect approximately 13 miles south of Hudson Canyon were the areas of investigation. Trawling was concentrated at 150 fathoms.

Trawling operations with a No. 36 trawl were carried out at only one transect on Georges Bank. Further operations were prevented by foul weather and icing conditions. Trawling operations with a No. 36 and a midwater trawl were carried out through 2 of 3 time periods. The third period was not completed due to adverse weather.

On Georges Bank, 20 species of fish were recorded with numbers of each varying according to depth. At Hudson Canyon 16 species were recorded. Whiting and white hake were most plentiful at 150 fathoms. No fish were taken in the midwater trawl.



North Pacific Exploratory Fishery Program

FISHING GEAR RESEARCH AND EVALUATION STUDIES CONTINUED:

M/V "John N. Cobb" Cruise 45: Fishing gear research and evaluation studies were scheduled by the U. S. Bureau of Commercial Fisheries' exploratory fishing and gear research vessel John N. Cobb in the Straits of Juan de Fuca and along the Pacific Coast of Washington from February 25-April 15, 1960.



SCUBA divers boarding diving sled preparatory to observing bottom trawls in action. Float in background is attached to door of trawl.

Preliminary tests and observations were to be made in the vicinity of Dungeness Spit at the eastern end of the Straits of Juan de Fuca. Comparative fishing tests of the modified trawls were to be made on the trawling grounds between Destruction Island and Cape Flattery off the Washington Coast.

Objectives of the cruise were to complete final modifications on the "free-wing trawl and the "blanket" trawl, which were originally designed and tested in 1959, and to systematically compare the fishing ability of the new nets with that of standard gear.

Nets modified to conform to characteristics suggested by last year's experiments were to be operated and observed in action by SCUBA divers riding a "diving sled." After final adjustments, test fishing was to be conducted on commercial bottomfish grounds. The new nets were to be compared as to efficiency with

a standard 400-mesh eastern-type otter trawl.

Note: Also see Commercial Fisheries Review, June 1959, p. 44 and May 1959, p. 30.



Radiation Preservation

GOVERNMENT INCREASES RESEARCH ON RADIATION PROCESSING OF FOODS:

Through the stimulus of the Interdepartmental Committee on Radiation Preservation of Foods, definite steps are now being taken to carry forward a national program of research and development on radiation processing of food. This important phase of the President's Atoms for Peace Program was announced on March 28 by Deputy Administrator of the Business and Defense Services Administration, U. S. Department of Commerce. He is Chairman of the nine-agency Committee.

The Atomic Energy Commission has established a program of research and development on low-dose radiation processing of perishable foods to extend shelf life. During the next five years the Atomic Energy Commission expects to spend approximately \$5 million on this project. During fiscal years 1960 and 1961, \$115,000 and \$500,000, respectively are being devoted to the program. Under the Atomic Energy Commission program, emphasis will be placed on basic studies in food chemistry, microbiology, wholesomeness testing, preservation factors of shelf life extension and radiation processing technology.

The Department of the Army has approved a revised Army food irradiation program. Over a six-year period, the Army Research program will cost an estimated \$5 million. It also proposes to construct a radiation food research facility to cost about \$1.8 million. This facility will consist of a megacurie cobalt 60 gamma irradiator, variable voltage linear electron accelerator, and associated facilities with emphasis on high-dose treatment of foods.

The Departments of Agriculture, Interior, and Commerce have conducted research and development in their re-

spective areas and indicate they plan to continue their individual programs in cooperation with the Army and the Atomic Energy Commission. Interior's work is on fishery products.

Research on the use of radiation for processing food must take into account the provisions of the several food regulatory acts, such as those administered by the Department of Health, Education and Welfare, and the Department of Agriculture. The wholesomeness and safety of radiation-processed food must therefore be established to the satisfaction of those agencies.

Agencies represented on the Committee are: Departments of State, Interior, Agriculture, Commerce, Health, Education and Welfare, Army, Atomic Energy Commission, Small Business Administration, and International Cooperation Administration.

As the national research and development program on radiation processing of food progresses, the Interdepartmental Committee through its member agencies will encourage commercial adoption of this technology.

Note: Also see Commercial Fisheries Review, October 1959, p. 16.



South Atlantic Exploratory Fishery Program

EXPLORATORY TRAWLING OPERATIONS OFF SOUTH ATLANTIC COAST:

M/V "Silver Bay" Cruise 22: An exploratory fishing survey was conducted along the South Atlantic Coast between Cape Hatteras, N. C., and Brunswick, Ga., during a 32-day cruise of the U. S. Bureau of Commercial Fisheries chartered fishing vessel Silver Bay, which ended on March 18, 1960. During the survey, 186 stations were made in depths ranging from 5-150 fathoms.

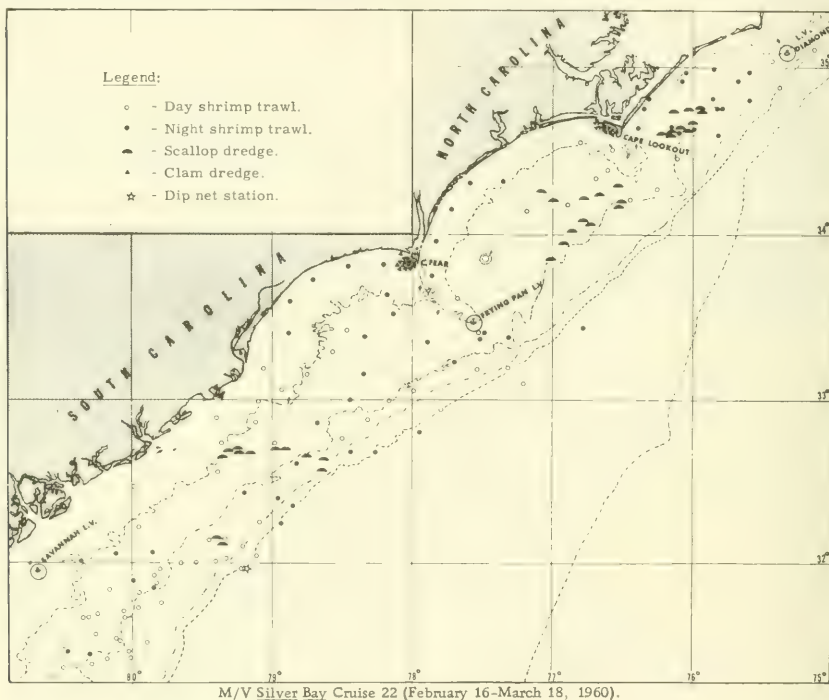
FISH: Exploratory trawling produced maximum catches of 1,000 pounds of mixed fish per one-hour drag. The best catches were made outside the 15-fathom curve

and consisted mostly of porgies (Stenotomus), lizardfish (Synodus), sea robins (Prionotus), ling (Urophycis), small spots (Leiostomus), and croakers (Micropogon). Catches of flounders (Paralichthys), weakfish or gray sea trout (Cynoscion), and kingfish or king whiting (Menticirrhus) ranged from 0 to 75 pounds per tow. No appreciable difference was noted between the catch rates for the 45 day-time and 55 nighttime tows.

SHRIMP: Rock shrimp (Sicyonia) were present in small amounts in most drags

$\frac{1}{2}$ -hour drag were made in 16-19 fathoms off Core Banks, N. C. These catches were exceptionally free of trash. One 80-pound bushel yielded $3\frac{1}{2}$ pints of meats. Subsequent catches with a balloon trawl in 21 fathoms yielded approximately 4 pints of meats per bushel. From Cape Lookout, N. C., to Doby Sound, Ga., individual scallops were taken in depths ranging from 10 to 100 fathoms. A total of 57 tows were made.

CLAMS: Fourteen clam drags off Cape Lookout produced hard clams (Venus mer-



from Cape Lookout to Savannah in the 15-70 fathom depth range. Individual pink shrimp (Penaeus duorarum) and white shrimp (P. setiferus) were found in the 10-20 fathom depth range. No concentrations were observed.

SCALLOPS: Catches as high as 15 bushels of scallops (Pecten gibbus) per

cenaria sp.) at the rate of 1 to 5 bushels per hour. Limited explorations off the mouth of the Cape Fear River produced from zero to 24 clams per 15-minute tow in the 6 to $6\frac{1}{2}$ -fathom depth range. The clams ranged from 4- $5\frac{1}{2}$ inches in length and were equal in taste and texture to those previously located off Beaufort Inlet, N. C. A total of 28 drags were made.

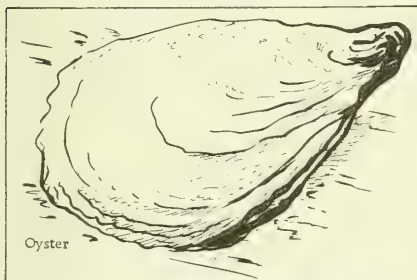
GEAR: More than half the drags were made with 41' / 47', $\frac{1}{2}$ -inch mesh cotton balloon trawl fished with 44' tickler chain 6' chain doors, and 6' legs on a 25-fathom bridle. One tow was with a 70' / 90', $2\frac{1}{2}$ -inch mesh nylon fish trawl on 8' bracket doors. For clams, a 14-tooth Fall River-type clam dredge was used. For scallops, a modified 8' Georges Bank-type scallop dredge with 2' rings and $1\frac{1}{2}$ " mesh liner was used.

Note: Also see Commercial Fisheries Review, March 1960, p. 26 and February 1960, p. 42.

South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, JANUARY-MARCH 1960:

Oyster Research: To determine with reasonable accuracy progress of seed planted on a subtidal oyster bed in the Ashepoo River, individual oysters from

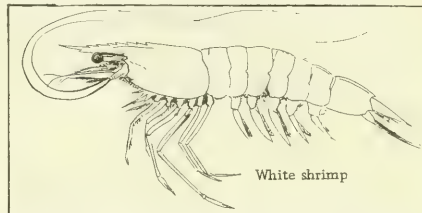


three plantings and native oysters dredged from the area prior to planting were measured, numbered, and placed in covered wire baskets. These baskets were attached to a wire cable which was then anchored on the bed, so that the baskets could be recovered easily. These oysters will be measured at intervals and records kept as to growth and mortality, according to Progress Report No. 43, Bears Bluff Laboratories, Wadmalaw Island, S. C.

Salinities in the area of experimental planting have varied widely during January-March--from 24.5 parts per thousand recorded January 12, to 11.6 parts per thousand on March 18, both from bottom samples.

Shrimp Research: The shrimp research continued on schedule throughout the quarter with experimental drags in inshore waters. Small white shrimp and croakers were particularly abundant, showing considerable increases over the same periods for 1958 and 1959. The abundance of white shrimp during the past winter should indicate a good catch for this species in the coming year, provided no great damage was caused by the cold snap experienced in March.

White shrimp were 88 percent more abundant in experimental drags at eight regular stations during January-March 1960 than for the same period of 1959, and were over 97 percent more abundant than during the same quarter in 1958.



Croakers were up 65 percent over last year and 82 percent greater than in 1958. Although spot showed no large increase, the average catch per unit of effort for this species was somewhat greater for the 1960 quarter than for the corresponding periods of 1958 and 1959.

A new program for the study of commercial shrimp postlarvae was initiated at Bears Bluff in January of this year. As a part of this study, 73 standard plankton tows were made during the quarter at regular stations throughout the shrimp survey area. A primary objective of this study is to determine the feasibility of obtaining postlarval shrimp as seed stock for commercial ponds. It is also felt that research on postlarval shrimp will prove of great value in the future with regards to such matters as predicting yearly abundance and distribution of commercial shrimps.

Considerable numbers of *Penaeus aztecus* postlarvae were taken in plankton tows during late February and early March, particularly in the Calibogue Sound and North Edisto River areas.

Shortly after the beginning of the cold spell in March, however, the numbers of these postlarvae declined suddenly at all stations. The extent of damage caused by the 6-10° F. drop in water temperatures cannot at present be ascertained.

Pond Cultivation: During the quarter, the Laboratories' oyster pond was drained and a considerable amount of silt was washed out by means of a pressure hose. Silting poses a great problem to oyster cultivation generally, and is particularly troublesome in pond cultivation. Experiments with transplanted seed oysters were expected to be resumed in the oyster pond during the second quarter.

Stocking of flounders and forage fishes in a quarter-acre experimental pond continued during the quarter. A number of northern and southern fluke, and four-spotted flounders, were stocked in the pond from January through March of this year.

Experimental work on the stocking of postlarval shrimp, using concrete tanks and a one-tenth-acre salt-water pond, is also in progress.



Transportation

RAILROADS ATTEMPTING TO MEET MOTOR CARRIER RATES FOR SHRIMP:

The Southwestern Freight Bureau, Inc., has proposed trailer-on-flatcar service (TOFC) rates on frozen shrimp from Texas and Louisiana points to compete with charges of exempt motor carriers. Following is a list and a comparison of rates:

Origin	Destination	Competitive Exempt Truck Rates	TOFC Rates
(Rate Per 100 Lbs.)			
New Orleans, La.	Memphis, Tenn.	\$ 1.25	\$1.25
New Orleans, La.	Chicago, Ill.	1.75	1.75
New Orleans, La.	Des Moines, Iowa	2.00	1.75
New Orleans, La.	Minneapolis, Minn.	2.25	2.25
Galveston, Tex.	Memphis, Tenn.	1.50	1.50
Galveston, Tex.	Des Moines, Iowa	2.00	1.75
Galveston, Tex.	Chicago, Ill.	2.00	2.00
Galveston, Tex.	Minneapolis, Minn.	2.25	2.25
Brownsville, Tex.	Memphis, Tenn.	1.75	1.75
Brownsville, Tex.	Des Moines, Iowa	2.25	2.25
Brownsville, Tex.	Chicago, Ill.	2.25	2.25
Brownsville, Tex.	Minneapolis, Minn.	2.50	2.25

The Texas and New Orleans Railroad, which serves Aransas Pass, Palacios, Port Lavaca, and Rockport, Tex., as well as Berwick, Houma, Lafayette, and Morgan City, La.,

will not be covered by this arrangement. This originating railroad for these places cannot count on sufficient volume of frozen shrimp or other commodities to construct facilities for profitable operation of this kind of service.

The proposed rail rates apply on frozen shrimp in packages subject to a minimum weight of 22,000 pounds based on the net weight of the shrimp. The weight of ice and packages is transported free subject to a limitation that the weight thereof shall not exceed 30 percent of the weight of the frozen shrimp. Shipments in trailers are accepted only when the carrier has suitable equipment.

The proposed rates are subject to diversion and reconsignment rules which provide that where instructions are received in sufficient time to be effected before the trailer is unloaded, the first diversion or reconsignment is without charge, the second is \$5, and the third and fourth are made at \$10 each.

The railroads earlier established favorable rates into the northeast for shrimp in regular carload lots but have yet failed to attract any significant volume of shipments.

This is another endeavor by railroads to meet exempt motor carrier competition. It is unusual for the railroads to charge on a net-weight basis. This points up the interest of railroads to attract shrimp traffic.

Tuna

TWO LARGE CALIFORNIA PACKERS OPERATING IN WEST AFRICA:

One of the three large California tuna packers in the fall of 1959 bought an existing cold-storage plant at Freetown, Sierra Leone, in West Africa, and is going ahead with plans to enlarge it into an Atlantic tuna fishing base. The company has come to an agreement with a large Japanese fishing company over the use of the base, and during February three Japanese tuna boats were expected to land fish at Freetown. The fish was to be transshipped to the packer's plant in Puerto Rico. The boats scheduled to land were No. 18 Azuma Maru (100 tons of albacore), the No. 1 Koyo Maru (280 tons of albacore), and the No. 2 Banshu Maru (770 tons of albacore), or a total of 1,150 tons. The cold-storage plant at Freetown was a small plant with only 150-ton capacity when purchased, but it has now been enlarged to an estimated 500-ton capacity. It is said that plans call for enlargement to 3,000-ton capacity soon.

Another of the three large California packers is also going ahead with plans for a cold-storage plant at the new port of Eima outside of Accra, in Ghana.

Japanese trading companies are also surveying West Africa areas at present with similar plans.



United States Fishing Fleet^{1/}Additions

FEBRUARY 1960:

A total of 26 vessels of 5 net tons and over was issued first documents as fishing craft during February 1960--a decrease of one vessel compared with the

Area	February		Jan.-Feb.		Total
	1960	1959	1960	1959	
	(Number)				
New England . . .	1	-	2	-	15
Middle Atlantic . .	3	-	4	-	12
Chesapeake . . .	4	4	9	13	106
South Atlantic . .	7	4	10	12	76
Gulf	3	10	7	16	135
Pacific	7	5	9	8	97
Great Lakes . . .	1	2	1	3	6
Alaska	-	2	-	2	32
Total	26	27	42	56	479

Note: Vessels have been assigned to the various areas on the basis of their home ports.

same month in 1959. The South Atlantic and Pacific areas led with 7 vessels each. The Chesapeake area followed with 4 vessels, while the Middle Atlantic and Gulf areas were next with 3 each. The remaining 2 vessels were issued first documents in the Great Lakes and New England areas.

Forty-two vessels were issued first documents during the first 2

months of 1960--14 vessels less than were reported during the same period of last year. Most of the decline was in the Gulf area which represented a decrease of 9 vessels as compared with the same period in 1959.

^{1/}Includes both commercial and sport fishing craft.

Table 2 - Vessels Issued First Documents as Fishing Craft by Tonnage, February 1960

Net Tons	Number
5 to 9	14
10 to 19	2
20 to 29	3
30 to 39	3
40 to 49	2
60 to 69	1
330 to 339	1
Total	26

U. S. Foreign Trade

CANNED FISH AND SHELLFISH EXPORTS, 1959:

United States exports of canned fish and shellfish have steadily declined in both value and quantity from 1955 through 1958. In 1959 there was a change and an increase took place in both quantity and value.

Table 1 - United States Exports of Fish and Shellfish, 1955-59

Item	1959	1958	1957	1956	1955
	(Millions of Lbs.)				
Quantity:					
Fish	54	32	51	63	71
Shellfish	13	8	17	19	18
Total	67	40	68	82	89
Value:					
Fish	17	11	12	13	17
Shellfish	4	3	4	5	4
Total	21	14	16	18	21

Table 2 - United States Exports of Fish and Shellfish by Principal Products, 1958-59

Product	1959		1958	
	Lbs.	\$	Lbs.	\$
Canned fish:				
Salmon	13,825,940	10,538,661	9,226,711	6,668,900
Sardines in oil . .	1,271,215	292,713	645,419	164,428
Sardines not in oil	37,453,480	5,843,435	17,816,275	3,231,400
Tuna	138,856	335,536	216,073	216,073
Mackerel	743,046	134,988	2,307,753	332,835
Fish, not else-where covered	371,847	326,474	1,199,115	495,844
Total canned fish .	53,898,447	17,375,127	31,530,809	11,109,480
Canned shellfish:				
Shrimp	2,876,493	2,898,453	2,161,451	2,548,019
Squid	9,156,111	905,516	5,583,257	500,711
Shellfish, not else-where covered	598,769	466,587	595,664	372,123
Total canned shellfish	12,631,373	4,270,556	8,340,372	3,420,853

* * * * *

EDIBLE FISHERY PRODUCTS, JANUARY 1960:

Imports of edible fresh, frozen, and processed fish and shellfish into the United States during January 1960 decreased by 16.4 percent in quantity and 12.1 percent in value as compared with December 1959. The decrease was due primarily to lower imports of groundfish and other fillets (down 7.6 million pounds) and frozen albacore and other tuna (down 8.6 million pounds), and to a lesser degree, a decrease in the imports of fresh and frozen salmon and shrimp. The decrease was partly offset by a 3.7-million-pound increase in the imports of canned salmon.

United States Foreign Trade in Edible Fishery Products, January 1960 with Comparisons

Item	Quantity		Value	
	January	Year	January	Year
	1960/1959	1959	1960/1959	1959
	(Millions of Lbs.)		(Millions of \$)	
Imports:				
Fish & shellfish:				
Fresh, frozen, & processed ^{1/} . . .	81.7	88.2	1,070.5	24.8
Exports:				
Fish and shellfish:				
Processed only ^{1/} (excluding fresh & frozen) . . .	6.6	2.4	68.0	1.8
	0.8	22.8		

^{1/}Includes pastes, sauces, clam chowder and juice, and other specialties.

Compared with January 1959, the imports in January this year were lower by 7.3 percent in quantity, but the value was unchanged. Lower imports of groundfish and other fillets (down 10.4 million pounds) and tuna other than albacore (down 2.7 million pounds) were primarily responsible for the decrease. Compensating, in part, for the decreases were increases of 3.8 million pounds in the imports of frozen albacore tuna, canned salmon (up 3.9 million pounds), and lobster and spiny lobster (up 1.8 million pounds).

United States exports of processed fish and shellfish in January 1960 were up by 20.6 percent in quantity and 20.0 percent in value as compared with December 1959. Compared with the same month in 1959, the exports this January were higher by 173.8 percent in quantity and 125.0 percent in value.

Total exports of processed fish and shellfish for calendar year 1959 were up about 65.0 percent in quantity and 41.2 percent in value as compared with 1958.



Wage-Hour Fishery Exemption

BREADED SHRIMP PROCESSING COMES UNDER EXEMPTION:

With reference to Secretary of Labor Mitchell's order requiring shrimp breading plants to pay Federal minimum wages under the Wage-Hour Law, Federal Judge Frank Scarlett recently rejected the Labor Secretary's order. The Wage-Hour Law includes the fishery exemption, which the Wage-Hour Administrator and the Secretary of Labor, through an interpretation, have tried to upset. The fishing industry has won a number of legal cases on the fishery exemption, but the Wage-Hour Administrator continues to bring court action in other jurisdictions.

The Federal Judge's ruling applies not only to the firm in Thunderbolt, Ga., which was involved in the case, but also to other firms engaged in shrimp processing. A St. Simons Island, Ga., shrimp firm intervened in the case on the side of the Thunderbolt, Ga., firm.

In his finding, the Federal Judge cited an exception allowed by Congress to the seafood industry and said if he found otherwise many packers might be put out of business since under the Wage-Hour Law employees may demand additional wages for the past two years.

The Labor Secretary last year said that adding as much as 20 percent of bread to a seafood ended its exemption as intended by Congress. The plants add varying amounts of breading, often running to about 50 percent.

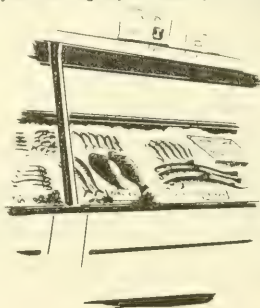


Wholesale Prices, March 1960

The March 1960 wholesale price index for edible fishery products (fresh, frozen, and canned) at 123.4 percent of the 1947-49 average was up 1.3 percent from the preceding month. Supplies of many fresh fish and shellfish items were curtailed sharply in March due to extremely stormy weather and resulted in higher wholesale prices for many fresh fishery products. From March a year ago to this March the wholesale fishery products price index was down by 3.7 percent due primarily to lower fresh and frozen shrimp prices and frozen haddock fillet prices.

The market for fresh haddock at Boston in March this year continued to be weak due to seasonally better landings and large inventories of frozen fillets. All other items in the drawn, dressed, and whole finfish subgroup were higher in March this year as compared with the preceding month with the exception of frozen dressed halibut, which was unchanged. The net result was an increase of one percent for the subgroup as a whole from February to March this year. Compared with March 1959 the subgroup wholesale price index was lower by 3.3 percent due chiefly to 12.4 percent lower drawn haddock prices at Boston and a drop of 12.4 percent in frozen dressed halibut prices. Lower prices for these items more than offset increases in the wholesale prices for frozen king salmon, fresh-water drawn whitefish and round yellow pike.

Fresh processed fish and shellfish prices in March this year were up by 5.7 percent from the preceding month due to a sharp rise (13.4 percent) in the wholesale price for fresh shrimp at New York and a lesser increase of about 1.9 percent in the price for fresh shucked oysters. These increases in March more than offset a 13.6-percent drop in the fresh small haddock fillet price. From March last year to March this year the subgroup wholesale price index dropped



2.5 percent. Fresh haddock fillets were lower by 27.4 percent and fresh shrimp down by 11.5 percent in March this year as compared with March 1959. During the same period shucked oyster prices rose 14.9 percent.

The wholesale price index for frozen processed fish and shellfish in March 1960 was down 1.0 percent from February. Frozen shrimp prices increased slightly (less than 1/2 cent a pound) and frozen ocean perch fillets rose by 3.6 percent in March from the preceding month. These increases in March this year over the preceding month were more than offset by an 8.0-percent drop in frozen haddock fillet prices. In March 1960 the subgroup wholesale price index was down by 18.5 percent from March a year ago. Lower frozen fillet

prices (particularly haddock which was down by 27.8 percent) plus a 21.0-percent drop in frozen shrimp prices were responsible for the decline.

Primary wholesale prices for canned fishery products remained unchanged in March 1960 for the fourth straight month. Supplies of California sardines and domestic canned salmon at the primary distributor level were about exhausted at the end of March. In addition stocks of Maine sardines were only fair and the only canned fish item in good supply was canned tuna. Compared with March 1959, primary canned fish prices were up about 5.1 percent this March due to higher prices for canned salmon and both California and Maine sardines. However, canned tuna prices were lower by 1.8 percent this March as compared with March 1959.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, March 1960 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ (\$)		Indexes (1947-49=100)			
			Mar. 1960	Feb. 1960	Mar. 1960	Feb. 1960	Jan. 1960	Mar. 1959
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					123.4	121.8	121.9	128.2
Fresh & Frozen Fishery Products:					137.6	134.9	135.1	148.8
Drawn, Dressed, or Whole Finfish:					148.5	147.2	148.7	153.6
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.12	.12	116.9	120.9	127.4	149.2
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.29	.29	90.3	90.3	93.8	103.1
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.78	.77	174.7	172.5	171.9	168.5
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.79	.75	195.8	185.9	159.9	166.1
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.72	.68	144.7	136.6	161.9	161.8
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.78	.73	181.8	170.0	166.5	170.0
Processed, Fresh (Fish & Shellfish):					142.2	134.5	135.3	145.8
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.35	.41	117.4	139.5	148.0	161.6
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.81	.71	127.2	112.2	106.6	143.8
Oysters, shucked, standards	Norfolk	gal.	6.75	6.63	167.0	163.9	173.2	145.4
Processed, Frozen (Fish & Shellfish):					109.1	110.2	107.9	133.9
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.38	.38	98.1	98.1	98.1	106.0
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.29	.31	89.5	97.3	97.3	124.0
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.29	.28	114.8	110.8	108.8	118.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.68	.68	104.5	104.1	100.3	132.3
Canned Fishery Products:					103.8	103.8	103.8	98.8
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	24.50	24.50	127.8	127.8	127.8	116.1
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	10.80	10.80	77.9	77.9	77.9	79.3
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	8.00	8.00	93.9	93.9	93.9	86.9
Sardines, Maine, keyless oil, No. 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.75	8.75	93.1	93.1	93.1	87.5

1/ Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.





International

INTERNATIONAL JOINT COMMISSION
(UNITED STATES AND CANADA)

INTERNATIONAL PASSAMAQUODDY FISHERIES BOARD COMPLETES ITS INVESTIGATIONS:

Members of the International Passamaquoddy Fisheries Board met with the International Joint Commission on January 13 to 15, 1960, in Boston, Mass. The purpose of the meeting was to explain to the Commission the probable effects of the proposed Passamaquoddy tidal power project upon fisheries of the area, principally in Passamaquoddy and Cobscook Bays in Maine and New Brunswick. Although the dams will eliminate several her-

ring weir sites, and changes in water level will require relocation or reconstruction of others, effects on the abundance of her-ring are expected to be negligible.

Groundfish landings also will suffer little change, but haddock will be eliminated inside the impoundment, pollock landings will be reduced, and winter flounder catches will increase. Clam production will be reduced, but scallop landings should increase. Lobsters may increase slightly in abundance, but conditions for holding lobsters in pounds will deteriorate. Shipworm damage to wooden structures will increase.

These changes will be brought about from the effects of changes in environ-



Fig. 1 - Passamaquoddy Fisheries Board and advisers. Photo taken at the January hearings; from left to right at the front table: Robert L. Dow, Maine Department of Sea and Shore Fisheries; Dr. Giulio Pontecorvo, Department of Economics, Bowdoin College, Maine, and Board members M. B. Pike, Lubec, Maine, Dr. J. L. McHugh, U. S. Bureau of Commercial Fisheries, and Dr. J. L. Hart, Fisheries Research Board of Canada. In the background, left to right, are W. F. Doucet, Canadian Department of Fisheries; Dr. R. W. Trites, R. A. McKenzie, and S. N. Tibbo, Fisheries Research Board of Canada; Dr. C. J. Sindermann and L. W. Scattergood, U. S. Bureau of Commercial Fisheries; D. F. Bumpus, Woods Hole Oceanographic Institution; and L. R. Day, Fisheries Research Board of Canada.

International (Contd.)

mental conditions. The project under consideration would create two pools, one of which would have an average water level about 6 feet higher than at present, the other about 5 feet lower. Because the filling gates will be closed during about three-quarters of the tidal cycle, water circulation will be reduced. Seasonal variations in water temperature will be greater, and surface waters will be warmer in summer, colder in winter. Average salinity of the surface waters will decrease. These changes will increase the amount of ice cover in winter. Dissolved oxygen in the deeper waters will be reduced.

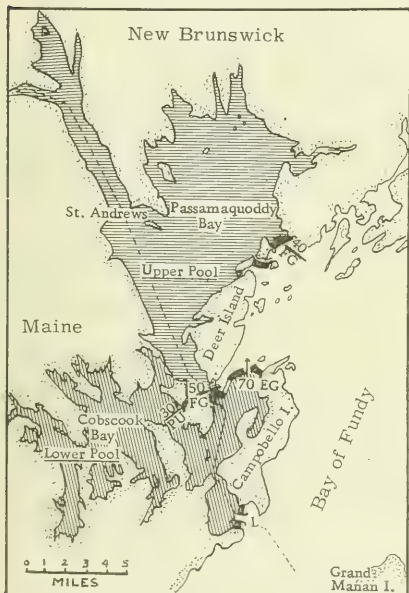


Fig. 2 - Passamaquoddy Tidal Power Project plan selected for detailed design.

The possibility of harnessing the power of the tides is a dream of long standing. Small tide mills were not uncommon along the Atlantic coast of North America in the last century but these were simple affairs, driven directly by tidal currents, and quite inefficient in their utilization of the available forces.

The Passamaquoddy project has been under serious consideration for more than 30 years, and the International Passamaquoddy Engineering Board has just completed a detailed study of the engineering and economic aspects.

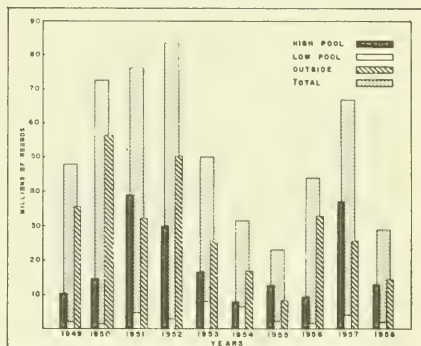


Fig. 3 - Total (Canadian and United States) herring landings in the high and low pools and in the part of the Quoddy Region outside the proposed dams.

Only a few places in the world have sufficient tidal rise and fall and suitable topography for practical utilization of the tidal power concept. The Bay of Fundy region, with the greatest tides in the world, is a particularly favorable spot. With completion of the Fisheries and Engineering Boards' studies, this project has become a serious possibility.

--J. L. McHugh, Chief,
Division of Biological Research
U. S. Bureau of Commercial Fisheries

Note: Also see Commercial Fisheries Review, April 1960, p. 38.

LAW OF THE SEA

SECOND CONFERENCE CONVENES:

The United Nations Conference on the Law of the Sea was convened at Geneva, March 17, 1960. The opening meetings were devoted to the election of officers, adoption of the agenda, and adoption of the rules of procedure. Prince Wan Waihayakon of Thailand was elected President by acclamation and Dr. Jose Correa de Ecuador was elected without opposition as Chairman of the Committee of the Whole. Max Sorenson of Denmark was elected Vice-Chairman of the Committee of the Whole and Edwin Glaser of Rumania, Rapporteur, Committee of the Whole. Representatives of the following countries were elected as Vice Presidents: Albania, Argentina, Canada, China, France, Ghana, Guatemala, Italy, Iran, Mexico, Norway, Poland, Switzerland, U. S. S. R., United Arab Republic, United Kingdom, and United States. These together with Prince

International (Contd.):

Wan and Dr. Correa form the 19-man Steering Committee. Representatives of the following countries were named to the Credentials Committee: Brazil, Chile, France, Greece, Indonesia, Liberia, Sudan, U. S. S. R., and United States.

The agenda was adopted without change. The rules of procedure were also approved but with certain amendments proposed by the Mexican delegation. Of these the one of some significance, which was opposed by the United States delegation, concerns the question of reconsideration of proposals in the Committee of the Whole. Voting on proposals in the Committee of the Whole is by simple majority. Proposals which receive such majority are referred to the Conference Plenary, where a two-thirds vote is required for adoption. Proposals which fail to get a simple majority in Committee are dropped from further consideration unless a motion to reconsider is approved by the Committee. The provisional rules of procedure had provided that a simple majority was required for reconsideration; the Mexican amendment, as adopted by a vote of 41 to 30 with 7 abstentions, requires a two-thirds vote.

Three proposals have been submitted to the Conference.

The Soviet Union proposed on March 21 that each state be entitled to fix the breadth of its territorial sea at any distance up to 12 nautical miles, and to have an exclusive fishing zone of 12 miles. If the territorial limit were set at less than 12 miles, the state might nonetheless have a 12-mile fishing zone.

Mexico proposed on March 21 that each state be entitled to fix the breadth of its territorial sea at any distance up to 12 miles. In addition, each state would have a contiguous fishing zone, the breadth of which would be determined according to a formula set forth in the proposal. Nations choosing a territorial sea of from 3 to 6 miles would be granted a contiguous fishing zone 12 to 15 miles wide, as the case may be, for a total of 18 miles; nations choosing a territorial sea of from 7 to 9 miles, a contiguous fishing zone 6 to 8 miles wide, for a total of 15 miles; nations choosing a territorial sea of from 10 to 11 miles, a contiguous fishing zone 1 to 2 miles wide, for a total of 12 miles; and nations choosing a territorial sea of 12 miles would be granted no additional contiguous zone.

Neither of these proposals makes any provision for continuation of traditional fishing activities of other states off foreign shores.

The United States proposed on March 23 a 6-plus-6 plan, in which the territorial sea would be fixed at 6 miles and an outer 6-mile contiguous fishing zone would be established. In the outer zone, nations which had traditionally fished off foreign shores in areas within the 6- to 12-mile band would continue to do so, for "the same groups of species. . . to an extent not exceeding in any year the annual average level of fishing carried on in the outer zone" during the five-year period immediately preceding January 1, 1958.

Presenting the U. S. proposal, Arthur Dean, chairman of the United States delegation, said that the United States feels that failure to reach any agreement at this Conference would be a "serious and unfortunate mistake." However, in order to reach agreement, we feel we "must refrain from pursuing our preferred solution," he continued.

"The solution preferred by the United States which we believe to be in the interest of all nations, large and small, is a width of 3 miles and no more. The United States prefers that there be no exclusive fishery jurisdiction beyond the 3-mile limit. Efforts to maintain and maximize fishery production, a highly desirable objective, have, we believe, little to do with arbitrary lines drawn by man in or on the ocean. . .

"I find it hard to believe the logic, and the basic self-interest of nations, large and small, maritime and not-yet maritime, fishing and not-yet fishing, do not weigh heavily on the side of continuing to maintain the traditional 3-mile limit.

"The United States adheres, has always adhered to this limit, and for this reason shall continue to do so if there is no agreement reached here."

The Department of State announced on March 11 that President Eisenhower appointed Arthur H. Dean, New York City, as Chairman of the United States Delegation, with the personal rank of Ambassador, to the Second United Nations Conference on the Law of the Sea.

Dean also served as Chairman of the United States Delegation to the first United Nations Conference on the Law of the Sea which was held at Geneva, February 24-April 28, 1958.

Arthur L. Richards, Special Assistant to the Under Secretary for Law of the Sea, serves as Vice Chairman to Dean.

The Department also announced that President Eisenhower designated the Honorable Edward T. Miller, former member of the House of Representatives from the First District of Maryland as Alternate United States Representative, and as an additional Vice Chairman of the Delegation.

The Congress was asked to designate two Congressional Advisers.

Other members of the Delegation include:

Alternate United States Representatives:

Oswald S. Colclough, Vice Admiral, U. S. N. (Retired),
Department of the Navy

William C. Herrington,
Special Assistant to the Under Secretary
for Fisheries and Wildlife,
Department of State.

Arnie J. Suomela,
Commissioner of Fish and Wildlife,
Department of the Interior

David W. Wainhouse,
Minister-Counselor,
American Embassy, Vienna.

International (Contd.)

Raymund T. Yingling,
Assistant Legal Adviser,
Department of State.

Advisers:

Norman Armour, Jr.,
United States Mission to the United Nations,
New York, New York.

Frank Boas, Attorney,
Brussels, Belgium.

Wilbert M. Chapman,
Natural Resources Committee,
San Diego, California.

Ralph N. Clough,
First Secretary,
American Embassy, London.

George J. Feldman, Attorney,
New York, New York.

Leonard Hardy, Captain, U. S. N.,
Department of the Navy.

Wilfred A. Hearn, Captain, U. S. N.,
Department of the Navy.

Harold Hoag, Lieutenant Commander, U. S. N.,
Department of the Navy.

Nat B. King,
American Consul General,
Dacca, Pakistan.

Harold E. Lokken,
Manager, Fishing Vessel Owners Association,
Seattle, Washington.

John Lyman,
National Science Foundation.

William R. Neblett,
Executive Director,
National Shrimp Congress,
Key West, Florida.

Charles H. Owsley,
Deputy United States Representative at the
European Office of the United Nations and
Other International Organizations,
Geneva, Switzerland.

G. Etzel Pearcy,
Geographer,
Department of State.

Thomas D. Rice,
Executive Secretary,
Massachusetts Fisheries Association, Inc.,
Boston, Massachusetts.

Peter Roberts, Consul,
American Consulate General,
Seville, Spain.

Harry Shoshan,
Office of the Secretary,
Department of the Interior.

George H. Steele,
Director, Fishery Products Division,
National Canners Association,
Washington, D. C.

Fred E. Taylor,
Office of the Special Assistant to the Under
Secretary for Fisheries and Wildlife,
Department of State.

William Terry,
Fish and Wildlife Service,
Department of the Interior.

William Witman, II,
First Secretary,
American Embassy, Paris.

Edward E. Wright,
Office of the Special Assistant to the Under
Secretary for Law of the Sea,
Department of State.

Secretary of Delegation:

Virgil L. Moore,
Resident United States Delegation to
International Organizations,
Geneva, Switzerland.

Technical Secretary:

Ernest L. Kerley,
Office of the Assistant Legal Adviser
for United Nations Affairs,
Department of State.

The Conference undertakes to resolve two highly important problems left unsolved by the 1958 conference--the breadth of the territorial sea and fishery limits. Representatives from about 89 countries were invited to participate.

NORTHWEST ATLANTIC FISHERIES COMMISSION

FISHING TRENDS IN
NORTHWEST ATLANTIC:

Canadian landings from the International Commission for the Northwest Atlantic Area were 9 percent higher in quantity in 1959 than in 1958. This was due to increased landings of cod and haddock, whereas ocean perch or redfish landings fell far below those of 1958. January 1960 compared to January 1959 showed a great increase in ocean perch landings and a somewhat smaller increase in cod landings, whereas haddock landings were far below those of January 1959.



Cod landings from the trawl and trap fishery in Newfoundland and from the trawl fishery in the Gulf of St. Lawrence were highly satisfactory during the 1959 summer. Off Labrador the summer fishery for cod yielded exceptionally good catches. During late summer, ocean perch which had been scarce returned in fair quantities in the Gulf of St. Lawrence. During autumn--in spite of unfavorable weather conditions, the Newfoundland fisheries

International (Contd.):

continued to consolidate their recovery from the very poor year of 1958.

The Faroese fisheries off West Greenland stopped in 1959 by the end of October. The catch was not satisfactory, partly because of bad ice and weather conditions, and partly owing to a scarcity of cod.

A joint Danish-Faroese-Norwegian fishing concern is planning a considerable development of its fishing plant in Faeringehavn, West Greenland, especially to meet the increased demand for fillets.

The third French campaign to the Northwest Atlantic was under way in October. The catches reported from the Labrador and West Greenland areas were, up to October, rather unsatisfactory.

The French trawlers started in January on the first trip to the Convention Area in 1960. About 32 trawlers are expected to take part in the fishery this year. In 1959 a total of 34 trawlers took part in the fishery. During the latter part of the year's fishery, a considerable increase in size of the cod caught in West Greenland waters was observed, and due to this a more satisfactory fishery is expected in 1960.

German trawl fishing mainly for ocean perch was carried out during the autumn of 1959 along the northeast shelf of the Newfoundland Bank with most satisfactory results, and with a catch per unit of effort about one-third higher than that from any other fishing grounds. The fishery was started in this area following an exploratory trip by a German trawler to the area between Flemish Cap and Labrador.

Norwegian hand-liners and trawlers returned from their last 1959 trip to the ICNAF area during October-November 1959. The fishery was carried out in West Greenland and in the Newfoundland area; off Greenland mainly for cod for salting with only insignificant catches of halibut; off Newfoundland as a mixed fishery for cod and halibut.

The last Spanish trawlers returned from the ICNAF area in December; the fishery in 1959 was reported as being better than in 1958. The 1960 campaign was expected to start at the end of January.

Russian exploratory trawlers in 1959 worked off West Greenland and found rich fishing grounds for cod and ocean perch on the banks and their western slopes between Kap Farvel and Disko Island. Data for preparing a fishery chart of the area were collected.

UNITED NATIONS

UNITED KINGDOM FIRST TO RATIFY 1958 CONVENTIONS ON TERRITORIAL SEA AND FISHERY CONSERVATION:

The United Kingdom has become the first country to ratify 2 of the 4 international conventions adopted by the United

Nations Conference on the Law of the Sea in April 1958, the United Nations Office of Legal Affairs announced March 15, 1960. British ratifications of the Convention on the Territorial Sea and the Contiguous Zone, and of the Convention on Fishing and Conservation of Living Resources of the High Seas, have been received at U. N. Headquarters.

In addition, the United Kingdom's ratification of the Convention on the High Seas was received. It is the second ratification of this treaty, the first having come from Afghanistan.

Each convention needs a total of 22 ratifications to bring it into force. A fourth treaty adopted by the 1958 Conference on the Law of the Sea, dealing with the continental shelf, has not yet been ratified. It also needs 22 ratifications.

The Convention on the territorial sea embodies the results of work of the 1958 conference on that subject but does not cover the width of the territorial sea, which was considered at a second U. N. conference in Geneva on March 17. Among other things, this convention establishes specific rules for the right of innocent passage of ships through territorial waters, with separate references to merchant vessels, government-owned ships used commercially, and warships; and lays down the rights and duties of states through whose waters the ships pass.

In addition, regarding the "contiguous zone," the convention gives the right for each state to exercise controls regarding fishing, emigration, customs and sanitation within a 12-mile belt to prevent infringements of the territorial sea.

The Convention on the High Seas among other things, provides for freedom of the high seas; specifies that "states having no sea coast should have free access to the sea"; deals with the nationality and the flag of ships; regulates practices on the high seas, including such matters as assistance to ships in distress, piracy, and the "right of hot pursuit" of foreign ships; calls for measures to prevent the pollution of waters by oil or radioactive waste; and deals with the laying of submarine cables and damage to them.

International (Contd.):

The Convention on Fishing and Conservation establishes regulations on the conservation of fisheries on the high seas, lays down rules under which measures promulgated by one nation are applicable to other countries, and sets out arbitration procedures.

Note: Also see Commercial Fisheries Review, February 1960, p. 61; November 1959, p. 100; August 1959, p. 40; February 1959, p. 49; January 1959, pp. 54 and 71.

TRADE AGREEMENTS

ICELAND-EAST GERMANY TRADE AGREEMENT INCLUDES FISH:

Iceland has concluded a new trade agreement with East Germany, which includes some fishery products exports from Iceland to East Germany. The new list does not mention the subject of fishing vessels which has been important among East German export items. The 1960 protocol had been under discussion for some time. The actual negotiations have been between the Icelandic Chamber of Commerce and the German Democratic Republic Chamber of Foreign Trade. Some of the talks were held September 21-22, 1959, in Berlin, but the 1960 protocol was signed November 20.

A decline is noted from the 1959 agreement in respect to salted herring. Last year's provided for 65,000 barrels, whereas the new agreement provides for only 50,000 valued at US\$1.1 million. However, the possibility of purchasing additional herring is left open. By far the most important item in the agreement from the Icelandic side is the sale of at least 9,000 metric tons of frozen fish valued at \$3.15 million. East Germany is apparently quite interested in purchasing Icelandic frozen fillets and also would have been willing to take more than the 2,000 metric tons of fish meal (valued at \$340,000) provided for in the agreement.

Note: See Commercial Fisheries Review, January 1959, p. 54.

WHALING

WHALE OIL SALES:

The Norwegian whaling companies have reported to the press that 100,000 long tons of whale oil had been sold. The Norwegian marine oil processors

have bought 40,000 tons, and 60,000 tons have been sold to a large British firm. The price was reported as £72 10s. (US\$203) a long ton, or the same as the price paid by the British firm last year, but other unspecified conditions are reported to be more favorable for the sellers.

The press article includes reports on other sales of whale oil which have been made: 50,000 to 60,000 tons from Japan to the same British firm that bought the Norwegian oil; the total British production also was sold to the same British firm, with the exception of 8,000 tons which have been sold to independent buyers on the European Continent; Japan had previously sold 13,000 tons. The sales of Japanese and British oil to the British firm are reported at the same price as the price paid for Norwegian oil.

Total 1960 Antarctic whale oil production by the Norwegian expedition is presently estimated at about 120,000 metric tons, or roughly the same as in 1959. (United States Embassy, Copenhagen, report of March 11, 1960.)

* * * * *

NO WHALING IN CANADA THIS YEAR:

The British Columbia whaling fleet and land station will not operate this year. Some 60 men employed on the boats and 90 in the plant have been advised that the operation will be suspended. Hunting and processing normally commences in April and continues for six months.



At west coast Canadian whaling station skilled workers using flensing knives to strip off blubber. Giant calipers are used to measure whale.

International (Contd.):

It seems evident that the reason for not operating this year is the depressed world markets for meal and oil.

LATIN AMERICAN FREE TRADE AREA AGREEMENT

An agreement to create a Latin American Free Trade Area was signed on February 18, 1960, culminating an intensive two-week conference in Montevideo. Representatives from Argentine, Brazil, Chile, Mexico, Paraguay, Peru, and Uruguay signed. Bolivia, although participating fully in the negotiations, did not sign but was granted four months to do so and still be considered a founding member. The agreement--to be known as the Treaty of Montevideo--will enter into force when ratified by at least three of the contracting parties.

The Treaty includes several annexed protocols relating to: (1) norms and procedures for negotiating reductions in restrictions, (2) the establishment of a provisional committee to act for the Association until the Treaty is ratified, (3) the form in which ECLA and the Interamerican Economic and Social Council are to provide technical advice, and (4) an exemption from Treaty requirements for agreements among the signatories on the purchase and sale of petroleum. Two Conference resolutions were signed at the same time as the Treaty. One grants Bolivia its four months to subscribe to the agreement as a founding member while the other calls for an informal meeting of Central Bank experts to study possible payments arrangements. (United States Embassy, Montevideo, February 24, 1960.)



Argentina

FISHERY TRENDS, FEBRUARY 1960:

Shrimp Fishery: The shrimp fishery in southern Argentina was over by early February with landings down sharply from the previous season. Ex-vessel prices were higher, ranging between 10 and 60 pesos per kilogram (5.4-30.7 U. S. cents a pound) according to size. The shrimp failed to appear in quantity

during the Argentine summer season. In the past, according to an article in an Argentine newspaper (*La Prensa*) of February 14, 1960, the shrimp vessels landed catches of up to 4 metric tons daily and landings were often limited because of the lack of processing capacity.

This past shrimp fishing season, severe weather along the coast curtailed the fishery from November 1959 to January this year. Fishing for shrimp in volume began about 1945 in the Comodoro Rivadavia area and also about 28 miles off the Rio Chabut. Since 1947 landings have decreased and the drop is attributed by some to overfishing by the up to 50 vessels fishing the above areas.

Shark Fishery: In February the fishery for shark (cazon) had started and catches by the fleet averaged about 500 fish a day. These sharks were sold at 120 pesos (US\$1.44) per fish, which is considered a good price.

Tuna Fishery: The Japanese tuna vessel *Yoshino Maru* landed at Mar del Plata on February 6, 1960, with its first trip from an Argentine port. The vessel landed 9,828 albacore, 931 yellowfin, and 103 big-eyed tuna, 2,467 swordfish, 1,697 white swordfish, 18 other swordfish, and 162 sawfish. Prior to this trip the vessel had landed a trip in November 1959, caught while en route to Argentina from Japan. Another Japanese vessel, the *Elsei Maru*, landed tuna and other fish at Mar del Plata in 1959. (United States Embassy, Buenos Aires, February 16, 1960.)



Australia

FISHING INDUSTRY PROTESTS MARKETING OF SMALL SHRIMP:

In January this year Australian fishermen and fish wholesalers united to protest the landing and sale of small shrimp (under 3½-inches in length with heads on). The legal minimum sizes for shrimp were abolished by the Government in May 1959. At about the same time the mesh size for shrimp trawls was increased from 1¼-inch to 1½-inch.

Australia (Contd.):

In abolishing the minimum size for shrimp the Government acted on the advice of its fisheries experts who claim that legal lengths have no conservation value since school shrimp don't spawn until $4\frac{1}{2}$ -inches long and king shrimp until 9 to 11 inches long.

The request to impose a minimum size limit on shrimp was made in a letter to the Chief Secretary's Department jointly signed by the president of the New South Wales Master Fish Merchants' Association and the secretary of the New South Wales Fishermen's Co-op Union Ltd.

The letter said: "At a meeting of the Committee of this Union with the Committee of the Master Fish Merchants' Association, it was decided that we voice our joint protest against the abolition of a legal minimum size of prawns and both bodies hereby express their desire that the Department immediately impose a legal minimum length of 3 inches on prawns.

"It is pointed out that with the recent glut of small prawns on the market it is the firm opinion of both bodies that a continuation of this policy will eventually lead to a reduced quantity of prawns being available for catch, and consequently the public will be excluded from prawn buying. Neither the Union of Fishermen's Co-operative, the buyers, nor the actual consumer desires that this small prawn be allowed on the market. (Fish Trades Review, January 1960.)



Brazil

JAPANESE FISHING COMPANY CLOSES BRAZILIAN RETAIL STORES TEMPORARILY:

The Japanese fishing firm, which has been operating out of Brazil since mid-1957, sold its landings of fish at retail through 14 sales units in the City of Sao Paulo.

The stands, small buildings with refrigerating facilities, were set up at

strategic points throughout the city under a special two-year license granted by the city government. The license expired at the end of 1959 and was not renewed. As a result, the Japanese firm and its distributors shut down and dismantled the fish stands. The catch from the company's fishing operations off the coast of Brazil, which totals over 400 tons of fish monthly, is now sold to wholesalers. The Japanese firm is dissatisfied with this arrangement, inasmuch as it is no longer able to control prices at retail levels, and has decided to rent space for retail stores at the locations where the fish stands used to operate. The company was planning to have a total of 11 outlets operational in late March or early April.

According to an officer of the Japanese firm, the company is now considering selling part of its catch of fish to the newly-created Centro Estadual de Abastecimento S. A. (State Supply Center) when that organization sets up facilities in various parts of the State of Sao Paulo.

The Japanese company now has in operation the full complement of ten vessels. (United States Consular report from Sao Paulo, March 4, 1960.)



Canada

BRITISH COLUMBIA SALMON MIGRATION AND ESCAPEMENT DEVELOPMENTS 1959:

Developments or trends of special interest associated with the British Columbia 1959 salmon migration and salmon escapement include:

1. The low returns of chum salmon to northern coastal areas are of major concern. In some cases they are the poorest on record. Despite an almost complete ban on fishing, chum escapement to Queen Charlotte Islands was very light, generally less than the weak brood year and only slightly better than the light runs of 1955 on the east coast and a portion of the west coast of Moresby Island. Escapement to streams of the Butedale area was the poorest on record, and in the Bella Bella area where fairly good runs were experienced four years ago a decline in the number of spawners was evident this year.

2. On the other hand, some improvement in chum runs to the southern areas of the Province over the weak 1955 cycle year was quite generally in evidence. The volume of catch reflected this improved state and spawning ground supplies were much more satisfactory.

Canada (Contd.):

3. Pink salmon runs generally were substantially below expectations based on good spawning escapements two years ago. The Fraser pink run was the second smallest in the history of the fishery and where a return aggregating some 4 million fish was looked for on the Skeena, the actual run was of the order of 2.2 million fish. The lesser returns are attributed to adverse survival con-

ditions in the province's rapidly expanding tourist and recreational fields in the southern coastal areas.

5. No large sockeye run was in prospect and returns were pretty much of the order anticipated with the exception of the Fraser where improved runs prevailed. The aggregate catch was appreciably reduced in volume by the two-week fishing tie-up during the last week in July and the first week in August.



Canadian purse-seiner brailing salmon out of the net.

ditions at sea. The volume of catch at some points was curtailed because of the two-week tie-up of fishing gear during the period July 25-August 9.

4. The coho and spring salmon runs were of good average volume. This is reflected by catch statistics and spawning ground escapements. Both of these varieties continue as a major attraction in

6. Regulatory measures in the interests of conservation were the most stringent and restrictive on record. These could not have been unexpected having regard to the degree of high efficiency, mobility, and skills being maintained by present-day fishing fleets and the fact that at best only moderate returning salmon runs were in prospect.

British Columbia Salmon Catch, 1952-1959

Year	Sockeye	Pink	Coho	Chum	Red & White Spring	Steel-head	Jack	Total
(Number of Fish)								
1959	3,259,600	6,776,300	2,896,900	2,015,200	868,000	13,500	80,300	15,909,800
1958	12,044,500	6,908,200	2,989,500	3,191,400	960,200	27,000	108,500	26,229,300
1957	3,036,000	11,310,400	3,136,700	2,412,000	823,400	16,800	109,700	20,850,100
1956	3,257,500	7,352,000	3,049,600	2,458,400	922,800	23,000	60,300	17,123,600
1955	2,835,500	11,246,500	2,970,000	1,567,600	786,500	23,500	85,500	19,515,100
1954	6,710,400	5,443,900	2,445,100	5,941,400	798,000	53,000	78,800	21,470,600
1953	5,926,700	11,110,000	2,894,000	4,670,000	943,400	43,100	70,500	25,657,700
1952	4,863,300	11,235,200	2,745,400	2,481,100	830,200	54,600	74,800	22,284,600

Canada (Contd.):

7. A significant development was the substantial catch gain in pinks made by trollers, particularly along the west coast of Vancouver Island, where the fish were still long distances from their spawning streams, and in the Alert Bay subdistrict. The trollers took 809,100 pinks or 11.9 percent of the total pink catch. In the Alert Bay subarea the troll pink catch comprised 20 percent of the subarea catch of this species. Because of the successful competitive effort with purse seines and gill nets in the Alert Bay area, trollers were required to observe special weekly closed seasons for a 3-weeks' period at the height of the pink run in common with the net fishermen.

8. Improved volume of chum salmon escape-ment to the spawning streams between Vancouver Island and the mainland and to the Harrison-Chehalis streams on the Fraser is directly attributable to the "four-ten" conservation formula, i.e., 4 days fishing followed by 10 days of closure, during the fall fishing season in all areas between Vancouver Island and the mainland, including Johnstone Strait, Gulf of Georgia, and Fraser River. A regular, progressive influx and distribution from the Johnstone Strait migration towards the many streams draining into the Straits of Georgia was attained and the enhanced spawning escape-ments should bear fruit four years hence.



Cuba

MEMBERS DESIGNATED FOR GULF OF MEXICO SHRIMP COMMISSION:

Three representatives of the Government of Cuba have been designated to serve on the Commission for the Conservation of Shrimp in the Eastern Zone of the Gulf of Mexico. The designation was made by the Ministry of Foreign Relations in Decree No. 2471, published in the Official Gazette No. 41 of March 1, 1960.

The members designated by the Cuban Government are Dra. Isabel Perez Farranté, Director of the Fisheries Investigation Section; Dr. Jose Acosta Jimenez, Biologist; and Rene Buesa Mas, Technician.

In accordance with the Convention between the United States and Cuba on the Conservation of Shrimp in the Gulf of Mexico, Cuba is responsible for designating three members for the Commission which is to be established to implement the Convention between the United States and Cuba.

The three United States members of the Commission have not yet been designated. The purpose of the Convention between the United States and Cuba is scientific research and the adoption of conservation measures affecting shrimp harvested by fishermen of both countries in the Gulf of Mexico off the coasts of Cuba and Florida, where important shrimp areas exist.

This is the ninth international agreement by means of which the United States is now cooperating with neighboring countries in the conservation of fishery resources.

* * * * *

FOUR IMPORTANT FROZEN FISH PRODUCTS COMPANIES INTERVENED:

Four important Cuban private frozen fish products companies in Habana Province have been intervened recently, according to a March 4 report from Cuba. The interventions were accomplished by resolutions issued by the Fisheries Division of the National Agrarian Reform Institute (INRA) signed by a Naval Captain of that agency, a delegate of the Office of Cuban Maritime Development (Oficina de Fomento Marítimo Cubano), and the president of the Cuban National Fisheries Institute (Instituto Nacional de la Pesca).

The "Whereas" clauses of one of the intervention orders attempted to justify the above action by claiming that the establishment of fishermen's cooperatives at over 20 ports in the Island had forced the INRA to assume control of packing firms in anticipation of increased fisheries production. It was further charged that it was "common knowledge" that the fish and shellfish packing firm was functioning in an "abnormal" manner and "did not fully render the social and economic functions it should." The Naval Captain of the INRA also reportedly stated that the companies were working only one or two days a week.

* * * * *

CLOSED SEASON ON SPINY LOBSTER AND BULL FROG SPECIES:

The Cuban National Fisheries Institute (Instituto Nacional de la Pesca) of

Cuba (Contd.):

the National Agrarian Reform Institute (I.N.R.A.) imposed a closed season on the capture of the spiny lobster species, *Panulirus argus*, effective March 15, 1960, and on the bullfrog species, *Rana catesbeiana*, effective April 1, 1960. The closed seasons will remain in effect until cancelled by subsequent I.N.R.A. resolutions.

The resolutions announcing the closed seasons appeared in the Official Gazette--that for spiny lobster in No. 42 of March 2, 1960, and that for the bullfrog species in No. 52 of March 16, 1960. Both were adopted upon the recommendation of the Director of the Fisheries Investigation Center. (United States Embassy, Habana, reports of March 11 and 23, 1960.)



Egypt

SHRIMP INDUSTRY:

Egypt's shrimp landings (heads on) have averaged about 5,318 metric tons annually for 1956-58. In 1959 estimates indicate landings were 450 tons higher.

The motor fishing fleet of Egypt consists of 157 vessels (excluding 329 vessels engaged almost exclusively in sardine fishing). The percentage engaged in shrimp fishing is not known. There are in Egypt no modern shrimp vessels of the type used in the United States. In addition, there are large numbers (perhaps 700-1,000) of small sailing vessels which are engaged part-time in shrimp fishing.

There are a number of plans, none of which have been implemented as yet, to either construct or purchase from abroad modern shrimp trawlers. Such plans do not call for more than 10 vessels during the next three-year period.

Shrimp exports are subject to the same currency control regulations as other Egyptian exports. There is no export tax on shrimp; there is, however, a quarantine inspection designed to assure the export of only wholesome prod-

ucts, the charge for which amounts to approximately \$4.88 a metric ton. (United States Consulate, Alexandria, report of December 15, 1959.)



German Federal Republic

MARKET FOR FROZEN FISH AND OTHER FOODS EXPANDING:

The frozen-food industry in Germany has developed more slowly than in any other country in Western Europe. But it is now firmly established and progressing rapidly.

In 1955, after studying the frozen-food industry in neighboring countries and in the United States, the Germans attempted to establish theirs on a better basis. It caught on and since then has grown steadily. In 1956 there were only 5,000 deep-freezers in German stores. At the beginning of 1959 nearly 20,000 units, many of them much bigger than the first ones, were in operation throughout the country, though only about 10 percent of the grocery stores have them.

Comparing frozen-food consumption figures in certain other countries points up the great possibilities for expansion in the German market of 51 million people. Sweden, with a population of only seven million, has more deep freezers than Germany.

The number of firms turning out frozen foods in Germany is rising rapidly; in 1955 there were only 17 but by 1958 there were 42. Despite this substantial growth, German processors feel that production will not be able to keep pace with demand and that more and more frozen foods will have to be imported.

There are also production and distribution problems stemming from the newness of the frozen-food industry in Germany. The establishment of an efficient delivery chain from warehouse to shop has proven difficult, as has maintenance of uniform quality.

Table 1 shows the pattern of German frozen-food consumption in 1958.

Table 1 - West German Frozen-Food Consumption, 1958

Product	Metric Tons
Fruits and vegetables	6,000
Poultry	5,000
Fish	2,000
Ice cream	1,500
Prepared dishes, miscellaneous foods	1,500
Total	16,000

The 2,000 tons of frozen fish consumed in 1958 were principally in the form of fillets; the more popular kinds are cod, ocean perch or rosefish, sole, and plaice, though frozen shellfish is also being sold in increasing quantities. It is expected that the growth of the frozen-food trade will benefit particularly the fishing industry because inland consumers will be able to have fish year-round.

German Federal Republic (Contd.):

Table 2 -Imports of Frozen Fish Fillets, 1957-59

Table 2 -Imports of Frozen Fish Fillets, 1957-59									
Country of Origin	Jan.-Sept. 1959			1958			1957		
	Quantity	Value		Quantity	Value		Quantity	Value	
	1,000 Lbs.	DM 1,000	US\$ 1,000	1,000 Lbs.	DM 1,000	US\$ 1,000	1,000 Lbs.	DM 1,000	US\$ 1,000
Norway	1,802	658	158	701	310	74	523	177	42
Denmark	1	2	1/	7	6	1	57	39	9
Britain	-	-	-	54	69	16	4	2	1/
Sweden	-	-	-	29	19	5	-	-	-
Japan	-	-	-	11	7	2	9	6	1
Iceland	-	-	-	3	2	1/	2	2	1/
Netherlands	1	1	1/	3	2	1/	-	-	-
Communist China . .	-	-	-	2	2	1/	-	-	-
Other	-	-	-	9	-	-	-	-	-
Total ^{2/}	1,804	661	159	819	419	100	595	226	54
^{1/} Less than US\$1,000.									
^{2/} Will not total since quantities less than \$1,000 are included in totals.									
Note: Values converted at rate of 4.17 Deutsche Mark equal US\$1.									

1/ Less than US\$1,000.

2/ Will not total since quantities less than \$1,000 are included in totals.

Note: Values converted at rate of 4.17 Deutsche Mark equal US\$1.

The import of most deep-frozen foods will be liberalized within the next one or two years and it is felt in trading circles here that it will be fairly easy to obtain import licenses during the intervening period.

Development of the frozen-food market has boosted the consumption of frozen fish, especially fillets. There is a strong interest in imported ocean perch or rosefish and cod fillets, and an indication that frozen shellfish would also be popular; those products have been liberalized. Principal foreign suppliers at present are the Scandinavian countries. (*Canadian Foreign Trade*, February 27, 1960.)

* * * * *

NORTH SEA TESTS PROVE MERIT OF NEW MIDWATER TRAWL:

A new type of the one-boat midwater trawl has been judged suitable for commercial fishing after a year-long trial in the North Sea.

Promising catches of herring and sprat had been reported during experiments in 1958 with the new gear. The gear consists of a high-opening nylon net, hydrofoil otter boards, and an echo-sounder telemeter, with the oscillator attached to the head rope of the net for continuous trawl-depth position and fish detection. This new equipment allows fishermen a degree of accuracy in the operation far superior to former midwater methods.

The gear trials were conducted by the Hamburg, West Germany, Institute for Fishing Methods and Gear Research for the Government, at the request of the Society of German Deep Sea Trawler Owners. Most of the technical development and experimental work at sea was planned and supervised by a gear technologist on the staff of the Fisheries Division of the Food and Agriculture Organization (FAO).

Basically, the FAO expert states, the problem was to devise an economic way for the German trawler fleet to catch herring, sprat, or any other pelagic (midwater) fish swimming higher than the reach of bottom trawls. The main demand for such means came from the smaller deep-sea trawlers who are not able to reach the distant fishing grounds off Greenland, Newfoundland, and Labrador. Furthermore, it was desirable to extend the herring season throughout the year to supply the herring processing factories and the fresh fish markets. Herring trawling had heretofore been restricted to the yearly periods when herring were on the bottom.

Midwater trawling with two boats, with the net towed between them, is an accepted method among North Sea fishermen. However, the two-boat method requires close cooperation between the two crews, and becomes risky in crowded fishing grounds, and in bad weather. It also is unsuitable for larger craft.

The experiments with the new gear, for one-boat trawling, began in December 1958. The first trips were mainly devoted to the technical development of the gear, with the catch being considered relatively unimportant.

The basic problem in midwater trawling is to adjust the net accurately to the depth of the fish. This requires a continuous indication of the depth of the net (so that proper action can be taken in time) and gear which can be quickly raised or lowered as desired.

The quick manoeuvrability of the gear is obtained by the special design of the hydrofoil otter boards. The idea of the echo-sounder telemeter, which is now being put to commercial use for the first time, has been used experimentally by other scientific workers. The present experiments included the development of this method to commercial reliability.

The echo-sounder oscillator attached to the bosom part of the headrope to sound downwards indicates not only the depth of the net, but also the position of the ground rope and the fish in the net opening and below the net. The connecting cable to the echo-sounding unit in the wheelhouse of the trawler is handled on large craft by an automatic electric winch. This enables the fisherman to know the depth of the net, to check if the gear is operating properly, and to see if the fish are really in the path of the net. With some experience, he should also be able to estimate the rate of catch from the fish traces in the net opening and so determine the right time for hauling.

Eight trips were taken with trawlers of 150, 600, and 1,400 hp, to develop and test the new gear. Trawling was done in the North Sea, the English Channel, and the Irish Sea at a towing speed from 3.5 to 4 knots. The opening height of the net was between 10 and 17 meters (32.8-55.8 feet), in depths down to 200 meters (109.3 fathoms), and with warp lengths up to 375 fathoms. Catches ranged up to 7 metric tons per haul.

During a final 12-day trip with a large deep-sea trawler, in the English Channel and Irish Sea, the net burst with an estimated catch of 30 metric tons. Although most of this catch was lost, this trip yielded 100 metric tons, mainly of herring with small amounts of mackerel and coalfish. This catch sold in Germany for about US\$14,500. This is not a tremendous catch for herring, the FAO expert states. However, it was considered significant since the test was conducted prior to the early winter herring season, at a

German Federal Republic (Contd.):

time when bottom-trawling fishermen were catching hardly any herring.

The new gear is expected to become a valuable means of extending trawling to periods when the fish are off the bottom and beyond the range of conventional bottom trawls. This should lead to increased economy in trawling through fewer interruptions of fishing due to unsuitable fish distribution, better exploitation of fishing grounds, extension of certain fishing seasons, and even by making new areas and fish stocks accessible.



Ghana

MANY NATIONS FISHING OFF GHANA:

Ghana, in Northwest Africa, is reported to have obtained promising results in its investigations for expanding fisheries in its waters. Concentration is on tuna. The studies were carried out by a United States fishery firm in cooperation with the Government of Ghana.

In addition to Japanese long-line tuna vessels, Russian, Norwegian, and French vessels are also reported fishing off Ghana in the Atlantic. The Soviet Union is reported to have carried out mother-ship-type tuna fishing off Cape Verde.

A law prohibiting foreign fishing vessels to operate in the territorial waters of Ghana has recently been enacted. (Japanese Fisheries Economic News, March 4, 1960.)



Greece

FROZEN FISH PRODUCTION INCREASED:

Replying to a question put by a member of Parliament, the Greek Minister of Industry stated that the production of frozen fish in Greece today reaches 5,000 metric tons and that it will reach 16,000-18,000 tons when all the freezer-trawlers under construction are operating.

The frozen fish will be used, on the whole, to meet Greek needs since local demand is good.

In January 1960, the freezer-trawlers Evangelistria I, Evangelistria II, Evangelistria III, Zephyros I, and Polikos worked off the coasts of Mauritania (Northwest Africa).

The freezer-trawler Polikos completed her maiden voyage fishing until January 20, 1960--110 metric tons of fish were caught (average daily production 3.5 tons).

The new factoryship Evangelistria IV was expected to leave Cornebourg (Vienne) for Vralla, but was delayed because of bad weather.

Preparations have been made to complete another three freezer-trawlers in Viareggio, Italy; and still another two freezer-trawlers (Alieia, February 1960).



Haiti

NEW FISHING COMPANY DEVELOPING FISHING INDUSTRY:

A new fish company is developing the fishing industry of Haiti with the aid of a Food and Agriculture Organization technical assistance fishery officer.

The main difficulty has been that up to now the Haitian fishermen have found it very hard to market their fish. There are very few paved roads in the country--the rest are jeep or mule tracks--which means that fresh fish never gets out of the coastal villages. What fish fishermen catch beyond their own needs, they salt and sell to professional trading women, known as Madame Sarahs, who come on donkeys over the mountains. These women pay the fishermen 5 to 7 cents a pound for their fish, and often buy on credit, rather than cash.



Fig. 1 - Cuban vessel Santona chartered by FAO fishery expert to explore tuna fishing possibilities. Fishing bonito with pole and line and using water spray to attract fish in waters near Haiti.

Haiti (Contd.):

The new company offered 10 cents cash a pound for fish. In one instance, the fishermen, in two days, landed 1,200 pounds of fish. Their previous production was 300 pounds a week.

A schoolmaster, recruited by the company to use his spare time buying fish, netted nearly the equivalent of his month's salary in two days of fish buying. His commission was one cent a pound.

The FAO expert from Canterbury, England, was sent at the request of the Haitian Government, to make a general survey of Haitian fisheries and proposals for fishery development. He decided on

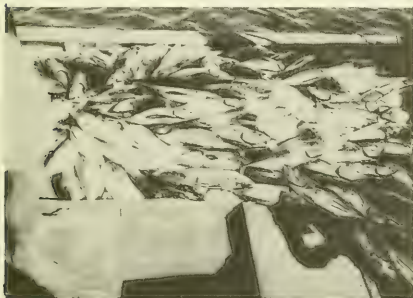


Fig. 2 - Part of a day's catch of bonito aboard chartered vessel *Santona*. Fish have been eviscerated and washed and are about to be iced down in the hold.

two main lines of approach. First, to try and develop a large-scale industry for fish like tuna to increase the animal protein in the people's diets, and second, to help the small fishermen improve production by developing their fishing methods and providing them with a market. These aims were in accordance with the Government's policy of encouraging new enterprises.

Since Cuba, Haiti's next door neighbor, was landing some 12 million pounds a year of tuna, mostly bonito and albacore, the FAO expert thought that these fish could also be found in the waters around Haiti, although the local fishermen were not fishing for them. On the advice of the expert, the Haitian government chartered a Cuban bonito boat with a skeleton crew and the fishery officer went out and tested and plotted the tuna grounds to be exploited. A second charter of the same boat was to demonstrate the commercial possibilities. Although the vessel operated at the end of the season, nearly three-fourths ton of bonito a day was caught. A very simple fish-drying station was set up at Mole St. Nicolas, the bay where Columbus first landed, and the dried salted fish were sold to the Haitian people.

The new company fitted out the 45-foot boat bought from the Coast Guard--the first motorized boat ever to fish commercially in Haiti--with an insulated hold and small refrigeration unit, besides the gear necessary for bonito fishing. Then, to assure themselves of a continuous source of a

variety of fish, they organized the fishermen in the scattered villages and began to collect fish from them. This April, the company plans to have its first try at the tuna.

To collect the fish, the company has established eight centers on the northern coast of Haiti's southern peninsula. There, its agents have started buying fish offered by the local fishermen, storing the fish in discarded domestic refrigerators packed with ice treated with antibiotics. The company's one boat has made regular rounds to deliver ice and to pick up the catch.

Now the new company has obtained a loan from the National Bank of Haiti, and a second Diesel-driven boat has been put into operation. This will enable the company to set up further collecting centers and permit fishermen in other outlying areas to sell their catch more profitably.

The new company has already opened three fish shops, one of which is particularly well equipped, in Port-au-Prince, Haiti's capital. All are clean and fitted with refrigerators. The company at present brings in roughly 3,500 pounds of fish a week, and this will increase as further centers are opened up and the company's newly-acquired cold storage goes into operation.

The company started exporting spiny lobsters, or crawfish, to the United States only last year. Now the company exports nearly 1,000 pounds of spiny lobster tails every two weeks.



Hong Kong

SHRIMP INDUSTRY:

Shrimp landings in Hong Kong in 1959, according to data furnished by the Fish Marketing Organization of the Cooperative Development Department of the Hong Kong Government, amounted to about 6.2 million pounds valued at US\$1.5 million wholesale. Landings for the first six months of 1959 of 785,000 pounds (valued at \$207,000) were down sharply from the 3.5 million pounds (valued at \$668,000) landed in the same period of 1958.

Cost of Production for Export: No detailed information on cost of production for export is available. As of June 1959, frozen headless and deveined shrimp for export was valued at 51.5 U.S. cents a pound to point of shipment or f.o.b.

Exports: Shrimp exports prior to January 1, 1959, were included with other fresh and frozen shellfish (crustaceans and mollusks). During 1958 a total of 6.6 million pounds (value US\$3.8 million) of fresh and frozen shellfish were exported. For the first nine months of 1959, exports of fresh and frozen shrimp (exclusive of other shellfish) were only 774,000 pounds, valued at \$515,000. The United States was Hong Kong's principal customer for fresh and frozen shellfish in 1958--shipments to the United States were about 4.1 million pounds, valued at \$2.8 million, or about 63.1 percent of the quantity and 74.0 percent of the value of fresh and frozen shellfish exports. In addition to exports of frozen shrimp to the United States, some quantities of dried, salted, or pickled shrimp were shipped.

The U. S. Treasury Department in mid-1959 prohibited shrimp imports from Hong Kong because shrimp produced in Communist China was coming into the United States through Hong Kong. Thus exports of shrimp to the United States from Hong Kong ceased in June 1959.

Hong Kong (Contd.)

Table 1 - Hong Kong's Shrimp (Heads On) Landings and Wholesale Value and Average Price Per Pound, 1958 and January-June 1958-59								
January-June 1959			January-June 1958			12 Months 1958		
Quantity	Value	Average Price	Quantity	Value	Average Price	Quantity	Value	Average Price
1,000 Lbs.	US\$1,000	¢/lb.	1,000 Lbs.	US\$1,000	¢/lb.	1,000 Lbs.	US\$1,000	¢/lb.
785	207	26.4	3,494	668	18.5	6,201	1,491	24.0

Table 2 - Hong Kong's Exports of Shellfish, 1958 and Shrimp, January-September 1959						
Country of Destination	January-September 1959		1958		1958	
	Fresh or Frozen Shrimp 1/		Fresh or Frozen Shellfish		Salted, Dried, or Pickled Shellfish	
	1,000 Lbs.	US\$1,000	1,000 Lbs.	US\$1,000	1,000 Lbs.	US\$1,000
United States 2/...	514	365	4,139	2,796	94	99
Canada	88	43	960	329	60	47
Other	172	107	1,460	655	1,115	445
Total	774	515	6,559	3,780	1,269	591

1/ Classification was changed on January 1, 1959, to separate shrimp from other shellfish.
 2/ Imports of frozen, dried, or otherwise preserved shrimp from Hong Kong to the United States in 1958 amounted to 4,029,143 pounds, valued at US\$2,803,015, and in 1959 totaled 640,000 pounds, according to U. S. Customs records.

Export Controls and Taxes: As of 1959 there were no export controls or taxes on shrimp. (United States Consulate, Hong Kong, report of December 9, 1959.)



India

SHRIMP INDUSTRY:

The shrimp fishery of India has in the past been confined largely to the shallow coastal waters (chiefly South India) and the catches are mostly small immature shrimp plus smaller quantities of the larger sizes. Biological surveys by the Government have indicated that the older shrimp inhabit the deeper waters. Evidence pointing to the presence of such shrimp in deeper waters has been afforded by the catches of large shrimp by pilot fishing trawlers of the Indian Government. Increased mechanization envisaged under the country's Second and Third Five-Year Plans is expected to help develop marine fishing by extending operations far beyond the present limits, and to increase the volume and change the character of India's shrimp catch.

Landings: Despite the relatively primitive nature of India's shrimp fishery, landings are considerable. (Term "shrimp" as used includes prawns and lobsters and no differentiation is made in

the Government statistics.) According to official statistics, landings amounted to about 20,000 metric tons during the first three months of 1959 and the total for the year was expected to be close to the 1958 landings of 85,200 tons. The landings for 1957 were reported to be about 136,812 tons and for 1956 close to 159,600 tons. In addition to the ocean catch, considerable quantities are caught in lagoons, estuaries, and fresh water for which reliable statistics are not available. No statistics on the value of the shrimp catch are maintained.

Fishing Fleets: No data on the number of vessels solely employed in shrimp fishing are available because of the fact that the use of a fishing vessel in India generally is not confined to catching any particular species but catches many types of fish. In 1959 there were about 95,000 nonpowered and about 1,600 mechanized vessels in the marine fishing industry. The mechanized vessels are divided among the coastal states about as follows: 1,300 in Bombay, 200 in Kerala, 50 in Madras, 30 in Mysore, 25 in Andhra Pradesh, and 10 in Orissa.

High priority is being given to the mechanization of fishing vessels, establishment of vessel-building yards, the supply of improved fishing gear, and provision of shore facilities for handling

India (Contd.):

catches. The Third Five-Year Plan (1961-66) target for mechanized vessels has been tentatively placed at 5,000 vessels.

Prices: The Ministry of Food and Agriculture states that ex-vessel prices differ widely from place to place and the approximate average ex-vessel price of shrimp is about Rs.25 a hundredweight (5.25 U. S. cents a pound). According to the Bulletin of Agricultural Prices, the market prices of shrimp in October 1959, averaged about Rs.84.00 (US\$17.64) per 100 pounds at Bombay and Rs.68 (\$14.28) per 100 pounds at Madras.

India's Shrimp (Frozen, Canned, Dried, etc.) Exports, 1957-58 and January-June 1959						
Country of Destination	Jan.-June 1959		1958		1957	
	Quantity	Value	Quantity	Value	Quantity	Value
	1,000 Lbs.	US\$ 1,000	1,000 Lbs.	US\$ 1,000	1,000 Lbs.	US\$ 1,000
Burma . . .	1,887	572	7,374	2,583	9,473	2,935
United States . .	968	460	1,463	749	932	438
Ceylon . . .	383	86	918	203	611	152
Singapore . .	95	32	102	31	408	43
Hong Kong . .	383	119	42	9	189	61
Other . . .	113	59	130	74	67	28
Total . . .	3,832	1,328	10,029	3,649	11,680	3,657

Note: Rupees converted at rate of Rs.4.730 equal US\$1 for 1958 and January-June 1959, and Rs.4.750 equal US\$1 in 1957.

Exports: Current export prices by types and sizes are not available, but export quantity and f.o.b. value statistics for the first half of 1959 indicate an average price of Rs.164 (\$34.44) per 100 pounds, as compared to Rs.148 (\$31.08) in 1957 and Rs. 172 (\$37.16) in 1958. The average value of shrimp exports (includes frozen, canned, dried, etc.) to the United States has been considerably higher than the average for exports to all countries--Rs.223 (\$46.83) in 1957, Rs.242 (\$50.82) in 1958, and Rs.224 (\$47.04) in January-June 1959 per 100 pounds. The composition of shrimp exports compared to total shrimp production accounts for the wide difference between average domestic market prices and average export prices.

Taxes: There are no restrictions on the export of shrimp. However, the Government levies a tax of Rs.0.75 (about 16 U. S. cents) per 100 pounds on all shrimp exported from India.

(Report of November 27, 1959, United States Embassy, New Delhi.)



Iran

JAPANESE-IRANIAN FISHERY ENTERPRISE AMONG FOREIGN INVESTMENTS APPROVED:

Among the foreign investment projects approved by the Iranian Government Foreign Investment Board is a Japanese-Iranian fishery enterprise. Activities of the firm consist of fishing and exploiting fish and other edible marine animals in the Persian Gulf and the Sea of Oman. The center of activity will be in Abadan. The Board of Directors consists of five members, three to be elected by the Plan Organization and the other two to be elected by the Japanese shareholders. The capital of the firm is 10 million rials (US\$66,666), and it operates in partnership with the Plan Organization. Two-thirds of the total capital (the initial capital is 30 million rials) belong to the Plan Organization.

The Foreign Investment Board, the chairman of which is the Governor of the Bank Melli, functions under the authority of Article II of the Law on the Attraction and Protection of Foreign Capital Investment of November 28, 1955. (United States Embassy, Tehran, March 2, 1960.)



Japan

FISHING INDUSTRY PREPARING FOR NEW EXPORT YEAR:

With the Japanese 1960 fishery products export year beginning on April 1, the associations of exporters of fishery products and the Government agencies concerned are reviewing the 1959 record and making plans for export quotas and their allocation for the coming year. As far as the plans for exports have been revealed, they indicate a cautious holding of the line at or below last year's level.

Figures prepared by the Japanese Fisheries Agency for the use of the var-

Japan (Contd.):

ious consultative councils on exports show that in calendar 1959 the value of Japan's fishery exports was US\$233 million, an increase of about US\$12 million over 1958. Because of the great over-all increase in all of Japan's exports, however, the relative weight of fishery products in the total declined from 7.7 percent to 6.8 percent. In terms of value, frozen products accounted for 20.2 percent of fishery products exports and pearls for 10.4 percent, both showing slight gains, while the relative importance of canned goods, dried and salted products, and fats and oils declined.

Plans for 1960 exports, which are well along toward final determination, call for 2.28 million cases of canned tuna for the United States market, a cut of nearly 200,000 cases from last year's target. Exports of frozen tuna to the United States are slated to be held at or near the 1959 target levels of 30,000 tons of albacore and 30,000 tons of yellowfin to be shipped from Japanese ports. The quota for transshipments of yellowfin from the Atlantic to United States canners is set at 100 trips as compared with last year's target of 120 trips (which, as it turned out, was not even approached in actual performance). Prepared cooked tuna loins, which have been a troublesome item in the past, would have been increased to 4,000 tons, if the industry's early views had prevailed, but it now appears that last year's export level of 3,000 tons will be continued. Production of canned sardines for export is reportedly to be cut to 755,000 cases, about 100,000 cases under last year because of uncertain prospects in the Philippines, Japan's principal market. Can-

ned crab-meat export sales plans call for continuation of the 1959 levels without important changes. (United States Embassy, Tokyo, report of March 18, 1960.)

TYPE-OF-PACK RATIOS ESTABLISHED FOR CANNED TUNA:

A directors' meeting of the Japanese Export Canned Tuna Manufacturers Association held on February 29 agreed that more than 40 percent of the tuna packed in 1960 should be white meat as compared to 35 percent in 1959. As regards the can type, the current ratio of No. 1 cans 20 percent, No. 2 cans 50 percent, and 2-kilo (4.4 lbs.) cans 30 percent would be followed in packing white meat and a new ratio of No. 1 cans 15 percent, No. 2 cans 40 percent, and 2-kilo (4.4 lbs.) cans 45 percent would be followed for light meat. In 1959 the ratio for light meat was 15 percent No. 1 cans, 45 percent No. 2 cans, and 45 percent 2-kilo cans. (Japanese fishery periodicals of March 1, 1960.)

PRODUCTION AND SHIPPING QUOTAS PROPOSED IN 1960 FOR FROZEN TUNA:

The Japanese Export Frozen Tuna Manufacturers Association held a directors' meeting on February 26 to determine Japanese production and shipping quotas for frozen tuna. The proposed quotas were to be presented at a general meeting planned for March 9, 1960. At the directors' meeting it was agreed to establish an "Atlantic Tuna Liaison Society" within the Association as a liaison group for those members who are engaged in Atlantic fisheries. The liaison

Japanese Production and Shipping Quotas for Frozen Tuna (Proposed for 1960 and Actual for 1959)

	1960	1959
Shipment quota for the United States (including Canada):		
Albacore	29,900 short tons	29,700 short tons
Yellowfin from Japan	30,000 " "	35,000 " "
Yellowfin transshipped from Atlantic Tuna loins	100 trips	120 trips
	2,980 short tons	2,980 short tons
Shipment quota for Italy	15,000 metric tons	12,000 metric tons
Broadbill swordfish for United States .	4,500 short tons	4,500 short tons

Japan (Contd.):

group is to meet monthly to discuss random sales of Atlantic frozen tuna.

On frozen tuna loins, an application has been filed for licensing 4,000 short tons. On frozen broadbill swordfish, the quota is being restudied before the general meeting because there is a strong demand from some members to increase it to 5,000 tons. (Japanese fishery periodicals of February 27, 1960.)

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CANNED TUNA CONTROL ORDER:

On February 14, the Japanese Fisheries Agency held a meeting of the Export Fisheries Promotion Council to advise on the "Ministerial Order for the Control of Canned Tuna Sales Methods in the 1960 Export Year" and received the Council's approval of the draft order. The draft is essentially the same as the regulatory provisions approved on February 1 by the general meeting of the Export Tuna Cannery Association. Its immediate objective is to apply to "outsiders" the same restrictions on production and sales that apply to members of the Association. The Ministerial Order will be in effect from April 1, 1960, to March 31, 1961. (Nikkan Suisan Tsushin, February 15, 1960.)

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FIRM PLANS TO RAISE SHRIMP IN PONDS:

A Japanese corporation, with head offices in Tokyo, is building Japan's first hatchery and rearing plant for "kuruma" shrimp (*Penaeus japonicus*) in abandoned salt ponds at Takamatsu in Kagawa Prefecture. The complete rearing of shrimp from the egg to the adult stage is planned. The shrimp farm is also an example of a way to utilize abandoned solar-salt beds.

Japanese aquaculture in shallow marine waters has been expanding rapidly. According to the 1958 fishery census, if 1953 is taken as 100, the 1958 production index for "nori" (laver) was 147, and for oysters was 150. However, "kuruma" shrimp rearing has been an exception in that the increase in production has been slight. There are various reasons why shrimp rearing has not developed, but the principal ones are (1) the only source of young stock has been from natural spawning and it has been very difficult to obtain, and (2) the supply of rearing stock has been so limited that its price has been high. If seed shrimp could be obtained easily and cheaply, shrimp rearing would expand.

The president of the firm (former chief of the Research Division of the Japanese Fisheries Agency) experimented for more than 10 years at his laboratory in Chiba Prefecture on the complete rearing of "kuruma" shrimp and finally succeeded in complete artificial propagation from

the egg to the adult stage. Since there were prospects for commercial success, he formed last September a corporation (capitalization ¥35 million or US\$87,000) with the support of two large Japanese fishing companies. He plans to establish commercial facilities for hatching and rearing shrimp in abandoned salt beds on the Inland Sea of Japan. The company is planning also to supply larval and juvenile shrimp for rearing to coastal fisherfolk at reasonable prices. Thus the company's operations will aid the development of shrimp culture and contribute to the prosperity of coastal fishery enterprises by solving the problems of difficult supply and high prices of seed shrimp.

The old salt beds which the company is to use for shrimp rearing are located west of Takamatsu, close to the large consuming area of Kyoto, Osaka, and Kobe. The officers of the company made a personal survey of the old salt beds around the Inland Sea and decided that the 11 hectares (27 acres) of salt beds near Takamatsu was the most suitable place. The beds were purchased in January for ¥10 million (\$28,000) and construction work was begun in February 1960 and is proceeding rapidly. According to the plans, the total construction cost will be ¥40 million (\$111,000). Facilities will include 89,000 square meters (557,996 square feet) of rearing ponds, 1,800 square meters (18,375 square feet) of nursery tanks, sea-water intake and drainage lines, filtering installations, a 60-ton water tank in addition to the existing 300-ton tank, refrigerated storage, feed preparation shed, laboratory, office, and living quarters. Construction was scheduled to be completed by the end of March 1960.

The corporation will begin shrimp rearing in April. According to operating plans, the eggs will be taken from breeding stock in that month (300,000-700,000 eggs per spawner) and will be placed in hatching tanks with apparatus for regulating the temperature. It is now possible to hatch and rear as many as 10,000 shrimp. The larval shrimp will develop in nursery tanks until June, then will grow to adult size in rearing ponds, and the first shipments will be ready for market in the autumn. It is planned to produce about 25 metric tons in 1960. The scope of the facilities will be increased progressively, and plans call for production of 225 tons in the second year, 3,000 tons in the third year, and 10,000 tons in the fifth year. For the present, the shrimp will be put on the domestic market, but future plans call for export to the United States.

In order for any form of aquaculture to develop as a modern industry, it must have the following elements: (1) the organism to be reared must have a short culture period and have a high commercial value; (2) production in large quantities must be possible; (3) it must be possible to lower the cost of production by technical progress; and (4) it must be possible to lower production costs by large-scale production and still leave possibility for further expansion. Most of the forms of aquaculture practiced at present do not have these factors, and they are not therefore developing into modern industries. For example, "nori" (laver) culture is producing a fairly large harvest, but the form of business organization is undeveloped and the industry has developed simply as an aggregation of very small enterprises (largely as a part-time occupation of coastal fishermen or farmers). On the shores of the Inland Sea the rearing of yellowtail has developed very rapidly in recent years, but because of the rapid increase in facilities and production, supply has exceeded demand, the price has dropped, and this year there are many operators who are losing money. Rainbow trout rearing, which has undergone an astonishing expansion in inland waters, is limited by environmental factors related to the water supply and is not suitable for a large-scale industry. The plan of the Japanese shrimp corporation for complete rearing of shrimp has all of the necessary elements. At present the total production of cultured shrimp is only 150 tons.

All of the prefectures around the Inland Sea have been trying to find ways of utilizing the abandoned salt beds of that area. According to the Japanese shrimp corporation, out of a total of 1,400 hectares (3,459 acres) of abandoned salt beds, about 500 hectares (1,236 acres) offer the proper conditions for rearing "kuruma" shrimp. Just by turning the shrimp loose in the salt ponds, a production of 3.75 kilograms per hectare (3.3 pounds an acre) is possible. The corporation is encouraging the use of the abandoned salt beds for rearing shrimp, and plans to supply seed shrimp at reasonable prices. It is also offering its plans to the prefectures around the Inland Sea and to salt companies in the area, showing them how shrimp culture can offer a new use for the abundant unused land and disused salt beds around the Inland Sea coast.

Japan (Contd.):

The Japanese Fishery Agency has been working on its plans for developmental financing in the 1960 fiscal year. Included in the plans is a loan for the "kuruma" shrimp rearing facilities. Of the total capital of ¥52 million (\$144,000), ¥20 million (\$55,000) is scheduled to come from the Development Bank. (Nippon Suisan Shimbu, February 16 and 19, 1960.)

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FISHERY PRODUCTS EXPORTS,
CALENDAR YEAR 1959:

At a February meeting of the Japanese Export Fisheries Promotion Council, the following data on Japanese fishery products exports in calendar 1959 were presented:

Product	1959		1958	
	Quantity	Value US\$	Quantity	Value US\$
Frozen products	164,317 short tons	47,239,000	130,679 short tons	42,931,000
Canned tuna (48 No. 2 cans/cs.)	3,442,555 cases	26,936,000	3,035,910 cases	23,267,000
Canned salmon (96 No. 2 cans/cs.) . . .	2,758,104 "	64,852,000	2,482,843 "	68,608,000
Canned crab meat (48 No. 2 cans/cs.) . .	760,663 "	15,115,000	681,758 "	12,814,000
Canned sardines (48 oval No. 1 cans/cs.)	629,710 "	4,756,000	687,789 "	5,237,000
Canned saury (48 oval No. 1 cans/cs.) . .	741,067 "	4,940,000	957,144 "	6,385,000
Other canned products	1,326,625 "	7,700,000	1,038,586 "	6,243,000
Salted and dried products	147,276 lbs.	5,716,000	204,176 lbs.	5,984,000
Fish and marine oils	103,564 metric tons	23,550,000	108,232 metric tons	25,302,000

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WINTER ALBACORE TUNA
FISHERY TRENDS, FEBRUARY 1960:

Landings of winter albacore were good during late February in the Shizuoka District of Japan, but landings of other tuna, mostly big-eyed, dropped.

Buying by canneries (which had been packing mandarin oranges--season was over) and freezing plants had become brisk since about the beginning of February. Each day 50 to 100 tons were landed at both Yaizu and Shimizu.

The landed price once showed a slight decline, but as buying became active the price stiffened. At the end of February the ex-vessel price for albacore was ¥100-105 a kilo (US\$252-260 a short ton) for prime fish and ¥80-90 a kilo (\$202-226 a short ton) for marbled fish. (Japanese fishery periodicals of February 26, 1960.)

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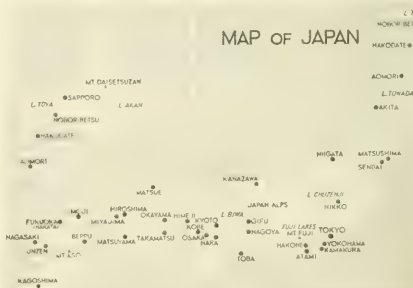
FORECAST ISSUED ON TUNA
FISHING CONDITIONS IN PACIFIC:

The Kanagawa Prefecture Fisheries Experimental Station released the following forecast on tuna fishing conditions in the Pacific in April-May 1960. The quantity given is the expected catch for a set of 18,000 hooks.

In the East Pacific (5° N. lat. -10° S. lat., east of 150° W. long.): Yellowfin catch ratio is on the increase in the area between the equator and 5° N. lat., and although it will be low in April, in May it is expected to be 1.4 metric tons at the equator--2° N. lat.; 1.8 tons at 2°-3°

N. lat.; and 2.3 tons at 3°-4° N. lat. Although yellowfin fishing is on the decline in certain areas, in the area of the equator--2° S. lat., and 4°-5° S. lat., the catch will be 1.8 tons more than other areas. Big-eyed tuna fishing is poor at 3°-5° S. lat., and on the decrease at 5°-7°, but catch is higher than surrounding areas with 2.3 tons at 3°-5° and 3.5 tons at 5°-7° in April, and about 2.3 tons in May.

MAP OF JAPAN



In the Central Pacific (5°-20° N. lat., 170° E. long.-150° W. long.): In the area around 5°-13° N. lat., between the Mar-

Japan (Contd.):

shall Islands and Fanning Island, big-eyed fishing is nearing the end of its good fishing period, and although in the usual year catches of 1.6 tons in April and 0.8 tons in May are obtainable west of 180° long., and 2 tons east of 180°, in April this year 0.8 tons is the expected catch west of 180°, and 0.4 tons in May. In the area east of 180°, 1.2 tons are expected in April and 1.3 tons in May.

In the Central Pacific (5° N. lat.-10° S. lat., 170° E. long.-150° W. long.): In the entire area, yellowfin fishing is entering into a good fishing season. Around the Gilbert Islands catches are expected to be 1.6 tons in April and 2 tons in May. In its eastern area 3.2 tons are expected and around Christmas Island 2.8 tons can be expected. Also 2.8 tons are expected in the area of the equator--5° S. lat., between the area south of Christmas Island and south of the Gilbert Islands; 1.6 tons near 5°-10° S. lat., and west of 180°; and in the east, 2.4 tons are expected. South of the line connecting three points, i.e., 10° S. lat., and 170° E. long., the equator and 175° W. long., 10° S. lat., and 160° W. long., the albacore catch is expected to be high with 0.8 tons at the equator--5° S. lat., and 1.1 tons at 5°-10° S. lat.

In the Central Pacific (10°-30° S. lat., 170° E. long.-150° W. long.): Good albacore fishing prevails in the area 10°-15° S. lat., with 0.9 tons. Also albacore is on the increase between 22°-30° S. lat., and the catch is either about the same or more, with 0.9 tons in April and 1.1 tons in May. In the area between the south and north fishing grounds, fishing is expected to be poor with 0.5 tons. (Japanese periodicals of March 5, 1960.)

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FINANCING FOR FISH-MEAL OPERATIONS IN NORTH PACIFIC:

A number of Japanese fishing companies have been seeking 800 million yen (US\$2.2 million) to finance their fish-meal factoryship operations in the North Pacific. As a result of conversations on January 28 between the Japanese Fisheries Agency and the Development Bank, it appears that a decision will soon be made

to supply the 350 million yen (\$972,000) requested by one of the fishing companies. The deciding factor in the firm's application was the fact that the tanker, which the company plans to buy from a Japanese oil company, was built with Development Bank financing and has already been partly paid for, so that the actual financing would amount to only about 120-130 million yen (\$333,000-361,000). It looks as if the 300 million yen (\$833,000) sought by another fishing company and the 150 million yen (\$417,000) asked by a third company are out of the question for this year but will be recommended for inclusion in next year's financing for fish-meal factoryships. (Nippon Suisan Shim-bun, February 5, 1960.)

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FISH MEAL REMOVED FROM LIST FOR TRADE LIBERALIZATION:

On January 29, the Japanese Ministry of International Trade and Industry removed fish meal from the list of items scheduled for liberalization after April 1960. Items scheduled for liberalization are placed on automatic allocation of foreign exchange for import.

The Ministry stated that the Peruvian fish meal price has dropped substantially, giving rise to fears that Japanese producers and fishermen would be adversely affected if imports increased.

Late last year in 1959 a Japanese trading firm contracted to import 4,500 metric tons of Peruvian fish meal, and it was loaded on January 16, for shipment to Japan. The meal was scheduled to arrive at Nagoya around the end of February. The purchase was made before the decision was made to remove fish meal from the list of items scheduled for liberalization.

Removal of fish meal by the Ministry of International Trade and Industry from the list of items slated for automatic allocation of foreign exchange has brought a feeling of relief to present North Pacific fish-meal factoryship operators--small producers as well as to big fishing companies. (Nikkan Suisan Tsushin, January 30, February 3 and 8, 1960.)

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Japan (Contd.):

EXPORTS OF PET FOOD IN 1959:

It is estimated that Japan sold about 450,000 cases of pet food to the United States in 1959. This is 10 times the exports in 1958 and represents 90 percent of initial predictions of 500,000 cases. About 90 percent was made from tuna and skipjack and the other 10 percent from saury or mackerel-pike.

Saury pet food, which was a new product introduced in 1959, has the advantage over tuna as far as the supply of raw material goes, and it is possible that it will greatly expand this year. However, according to informed sources, pet food made from saury is inferior in quality to that made from tuna. There is some uneasiness in Japan as to whether or not it will be accepted by consumers in the United States. (*Nikkan Suisan Tsushin*, February 11, 1960.)

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MACKEREL-PIKE FISHERY, 1959:

Japan's 1959 catch of mackerel-pike or saury was 518,679 metric tons, second in recent years only to the 1958 landings of 557,667 tons. Of the 1959 catch, 136,301 tons were landed in Hokkaido and 382,378 tons in the northern prefectures of Honshu.

Utilization of the 1959 catch was 35 percent for reduction, 31 percent for freezing, 22 percent for marketing fresh, 8 percent for canning, and miscellaneous uses accounting for the remaining 4 percent. The total 1959 saury oil production was 23,310 metric tons, and 38,328 tons of pressed scrap resulted.

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YELLOW SEA "TAISHO" SHRIMP CATCH POOR THIS YEAR:

Japanese "Taisho" shrimp fishing in the Yellow Sea, in contrast to last year's big landings, is really poor this year. One Nagasaki dealer who had 18 sets of pair trawlers in operation this season reports that whereas last year he got 40,000 cases (average 150 shrimp to the case), this season his boats landed only about 40 percent of last year's landings.

According to the Nagasaki Branch of another Japanese fishing company, it had 17 sets (34 boats) of trawlers working and got only about one-third of last season's landings of around 50,000 cases. Since the "Taisho" shrimp season runs only to the first part of March, it is certain that this season will be a poor one over-all. (*Nikkan Suisan Tsushin*, February 18, 1960.)



Republic of Korea

FUNDS EARMARKED FOR SOUTH KOREA'S FISHERIES:

The Combined Economic Board in South Korea in mid-March 1960 approved the release of counterpart funds for financing of irrigation projects, and also earmarked US\$700,000 of International Cooperation Administration salable imports for fisheries supplies for South Korea's fishing industry.

According to data released by the South Korean Office of Marine Affairs, a total of \$17 million of United States aid funds has been allocated for fisheries development since 1953. The money was about evenly divided between investment projects and imported supplies. The fishing industry suffered severe damages in the typhoon of September 1959, when nearly one-third of the total fishing fleet was destroyed. Second to housing, fisheries rehabilitation is receiving highest priority in allocation of typhoon relief funds. (United States Embassy, Seoul, report of March 18, 1960.)

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FISHING INDUSTRY HIT HARD BY TYPHOON:

The havoc of Typhoon Sarah which hit Korea in September 1959 is estimated to have cost the fishing industry fully one-fourth of the potential production of 1959. Out of a fleet of 37,000 fishing craft, 11,000 or nearly one-third were totally destroyed and numerous other vessels were damaged. With so many vessels out of commission during the fourth quarter, what is generally a highly productive season (especially for the an-

Republic of Korea (Contd.):

chovy and mackerel fisheries), 1959 marine production of 382,125 metric tons was off 3.3 percent from 1958 whereas developments before Sarah

struck in September had warranted expectations of peak postwar output.

Despite the unavoidable decline in the production, 1959 exports of all varieties of marine products, valued at



Republic of Korea (Contd.):

US\$4 million, were the highest since 1953. An unusually good crop this winter of laver (seaweed), which normally commands premium prices in Japan, portends continued progress of the marine-products category as an important earner of foreign exchange--assuming an early normalization of Korean-Japan trade relations, for Japan has been the sole purchaser of Korean laver and the major customer for all categories of marine exports.

Rehabilitation of the fishing industry is receiving high priority by a committee concerned with typhoon reconstruction. With over \$1 million in United States funds and 681.5 million hwan (\$524,000 at the rate of US\$1=1,300 hwan) allocated by the Korean Government, it is planned to construct 8,453 small craft (under 5 tons). A long-term, low-interest loan program is enabling individual fishermen as well as the fishery cooperatives and associations to resume their operations. (United States Embassy, Seoul, report of March 3, 1960.)



Mexico

GUAYMAS SHRIMP FLEET TIE-UP SETTLED:

The Guaymas (west coast) shrimp fleet, other than cooperative-owned vessels, was tied up because of a labor-management dispute from mid-January to March 20, 1960. Information has been received that the dispute was settled and the fleet was scheduled to resume fishing on March 22.

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SHRIMP INDUSTRY TRENDS, FEBRUARY 1960:

An ex-vessel price increase in Ciudad del Carmen and Salina Cruz, the continued tie-up of the Guaymas fleet, bad weather in the Gulf of Mexico, and the threat of possible U.S. import duties or quotas on shrimp were the topics of conversation in the Mexican shrimp industry in February.

The National Chamber of the Fishery Industry held its annual meeting during mid-February at which it was decided to ask support of the Mexican Government to oppose proposed tariff or quotas on Mexican shrimp entering the United States.

The Guaymas (West Coast) fleet, other than cooperative-owned vessels, has been tied up since about mid-Jan-

uary and there were no signs in February of an early return to fishing. The landings being made at Guaymas are mostly small brown shrimp.

Mazatlan and Salina Cruz (both ports on West Coast) catches are reported to be holding up, although boat owners are grumbling about losing money. Toward the latter part of February, Salina Cruz ex-vessel prices were increased one U.S. cent a pound. This followed a five-cent rise a week earlier in Ciudad del Carmen (East Coast). Guaymas and Mazatlan prices did not change. Increased ex-vessel prices are not indicative of an improved market. They are the result of a local buyers' dispute and probably are only temporary.

Mexican Ex-Vessel Shrimp Prices, February 29, 1960		
Size (No. Shrimp to Lb.)	Ciudad del Carmen (Brown and Pink)	Salina Cruz (Brown)
	.....(U. S. Cents a Lb.).....	
10-14	63	-
Under 15	-	48
15-20	58	-
16-20	-	46
21-25	49	34
26-30	44	28
31-35	39	-
31-40	-	26
36-40	33	-
41-50	28	21
51 plus	-	16
51-60	22	-
61 plus	17	-

In both Ciudad del Carmen and Salina Cruz, the ex-vessel price of white shrimp was two cents a pound across-the-board more than for browns. Salina Cruz was landing mostly large browns. Most of the catch was under 20 count shrimp. A succession of "northerners" in the Gulf of Mexico kept shrimp vessels in port for many days during February.

The Carmen landings-per-trip were about the same as in January, about 1,000 pounds of tails per trip. Campeche trips yielded less than during January and were about the same as those for Carmen. (The Carmen-Campeche landings per trip in January were reported to have been about 1,0 and 1.2 metric tons, respectively, but actually they were 1,000 and 1,200 pounds, respectively).

Carmen landings by species were the same as during January--about 50 percent pink, 35 percent white, and 15 percent brown. At Campeche the proportion of whites rose a bit to about 15 percent of the landings; pinks were about 85 percent; and browns were but a trace.

A greater proportion of smaller shrimp showed up in the Carmen February landings as compared with January. Only about 45 percent of the February landings were 30 count and larger, while in January 60 percent of the landings were in that category. Campeche landings also dropped in size composition from about 80 percent 30 count and larger during January to about 70 percent in February. (United States Embassy, Mexico City, report of March 4, 1960.)



Morocco

TRADE AGREEMENT WITH JAPAN INCLUDES FISHING ITEMS:

The Moroccan Bulletin Official of February 17, 1960, announced that the trade agreement of May 16, 1958, with Japan has been renewed. The renewal will extend from December 24, 1959,

Morocco (Contd.):

to December 23, 1960. The only items involving the fishing industry are exports of nylon and vinylon fishing nets (value \$400,000), nylon and vinylon ropes (value \$75,000), and plastic floats (value \$50,000) from Japan to Morocco. (United States Embassy in Rabat reported on February 23, 1960.)



Norway

SUPPLEMENTARY SUBSIDY FOR COD AND HERRING FISHERIES APPROVED BY PARLIAMENT:

Supplementary appropriations of 22 million kroner (US\$3.1 million) to subsidize cod and herring fisheries have been approved by the Norwegian Parliament. Of the total, 10 million kroner (\$1.4 million) is earmarked for the northern provinces. (News of Norway, March 24, 1960.)

STERN-FISHING TRAWLER TO BE BUILT FOR EXPERIMENTAL FISHING:

The Norwegian Ministry of Fisheries has proposed construction of a 150-foot-long stern-fishing trawler, to cost about Kr. 3.2 million (US\$448,000), for experimental fishing in North Norway. The tests should provide conclusive proof whether it is more efficient to operate the trawl from the stern rather than from the side of the trawling vessel.

Meantime, a three-man committee, named to explore means of assuring the supply of raw material for fish filleting and freezing plants in Troms and Finnmark, has recommended construction of three stern trawlers, to cost Kr. 5-6 million (\$700,000-840,000) each. If tests over a one-year period demonstrate their superiority over conventional side trawlers, the committee suggests it might be advisable to build up a fleet of 30 stern trawlers. This should provide enough fish to assure year-round operation and steady employment at all of the filleting and freezing plants in Troms and Finnmark.

A special type of stern trawler designed to meet Norwegian requirements has been extensively tested in the Ship Model Tank at the Norwegian Institute of Technology at Trondheim. The Bergen shipyard has developed an extremely efficient nozzle rudder, with built-in propeller, which looks very promising. At low speeds, the novel combination system provides 30 percent more thrust than a propeller alone, and better steering than a conventional rudder. (News of Norway, March 17, 1960.)

WINTER HERRING FISHERY FAILS AGAIN:

The 1960 seasonal herring fishery off the coast of West Norway has failed for the third year in a row. When the season for the fat or high-priced winter herring was called off at midnight February 23, the total catch amounted to less than 200,000 metric tons. This is the poorest result since 1946 when fishermen landed only about 125,000 tons. The start of the spring herring fishery on February 24, automatically reduced the price per ton, because of lower fat content.

Only nine of the 450 purse-seiners which took part in the winter herring fishery managed to catch more than the 1,000-ton minimum required for profitable operation. The rest finished the season deep in debt for gear and other equipment. The herring were too deep to be reached by purse seine.

Meanwhile, the Norwegian Prime Minister told Parliament that the government will appoint a special committee to propose measures for remedying the damage caused by the fishery failure. The committee will also evaluate problems arising from the steadily diminishing influx of herring. (News of Norway, March 3, 1960.)

HERRING FISHERY FAILURE IS GRAVE CHALLENGE TO INDUSTRY:

Failure of Norway's winter herring fishery should serve as a challenge to seek new fishing grounds and new operating methods, the Norwegian Fisheries Minister said in a recent address at Bergen. It is up to us, he stressed, to take advantage of the growing world demand for fishery products.

Norway (Contd.):

A strong plea was made for switching from purse-seiners to trawlers in the herring fishery. If fishermen show willingness to adopt new operating methods, he said the State would facilitate acquisition of larger engines and trawling gear.

Outlining a program for future development of the herring fishery, the Minister suggested that suitable purse-seiners, after installation of more powerful engines, should go over to trawling for herring in the North Sea, the Skagerrak, the Norwegian Sea, and off Iceland. As a natural supplement to trawling, some of the purse-seiners might take part in the annual winter herring fishery off the coast of West Norway. Their participation, however, should be guided by biological and hydrographic conditions. Drift-netters, too, should seek out the herring in the open sea, thus becoming less dependent on shoals reaching coastal waters. From now on these operating methods should receive decisive consideration in building new fishing vessels, the Minister continued.

Equally radical suggestions were recently offered by a Member of Parliament and Director of the North Norway Development Fund. He urged year-round fishing activities, primarily to be conducted by ocean-going stern trawlers. In his opinion, this is the only way to provide enough fish for Norway's large frozen fillet industry. Now able to operate but a few months a year at full capacity for lack of raw material, filleting plants are in serious straits. Until Norway's own fishing fleet is big enough to assure year-round operation of the filleting industry, he suggested that foreign fishing vessels be permitted to land their catch for processing at Norwegian plants. In his opinion, this would be a sensible division of labor.

The Member of Parliament emphasized that industrialization of Norwegian fisheries must be accomplished without destroying chances for part-time fishing, which provides supplementary earnings for thousands of small farmers in North and West Norway. The main objective, he said, should be to extend the radius of operation, with far more vessels engaging in ocean fishing. Stern trawlers, 150-200 feet long, would be best suited for that purpose. These craft, however, are far too costly for most fishermen, unless they receive assistance from the State. Considering the vital importance of industrializing the fisheries, he felt such aid would be warranted. (*News of Norway*, March 10, 1960.)



Pakistan

ABOLITION OF DUTY ON FISHING EQUIPMENT AIDS PAKISTAN'S FISHERIES:

Following the abolition of duty on imports of fishing equipment, thus putting it on a par with agricultural equipment, the marine boat-building business boomed in the East Pakistan ports of Chittagong and Khulna.

In January, a fishing firm in Cox's Bazar started deep-sea operations, sending the catch to Chittagong in "cold-storage" vessels. Arrangements are being made for freezing, canning, and exporting of fish from Chittagong and Khulna. The first shipment of frozen shrimp from East Pakistan to the United States was announced in November.

A new East Pakistan fishing firm is likely to be formed with help of Japanese capital and technical assistance, according to an announcement made by the new Government Food and Agriculture Minister in Chittagong in January this year. (United States Embassy in Dacca, reported February 9, 1960.)

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DEVELOPING SHRIMP AND OTHER FISHERIES:

Pakistan exports of frozen shrimp to the United States have climbed from 150,000 pounds in 1956 to 471,000 pounds in 1957 and 637,000 pounds in 1958. Twelve commercial trawlers are under construction by private individuals. Previously no commercial trawlers were in operation in Pakistan.



Bidding on fish at wholesale market at Karachi.

Interest and enthusiasm in the development of fisheries resources is high both among Government officials and private individuals.

United States Operations Mission-Pakistan has, through its aid in constructing a modern fish harbor at Ka-

Pakistan (Contd.):

rachi and encouraging the exploitation of fishery resources particularly by the private sector, been instrumental in the recent expansion of the fishing industry in Pakistan. Since October 1959, when the fish harbor and market was officially opened, an average of 100 metric tons of fish have been auctioned daily through the market. (United States consular dispatch from Karachi, March 7, 1960.)



Portugal

FISHERIES TRENDS, 1959:

The situation in the Portuguese fishing industry remained unchanged during the fourth quarter of 1959 as compared with the preceding quarter, and although final 1959 statistics were not available as of the end of January 1960, the results of the year are comparatively poor. While the various types of fishing which supply fresh fish for local consumption, principally the trawl catch, had a satisfactory year, there was a decline in the sardine catch, and the cod season on the Newfoundland and Greenland banks is regarded locally as "disastrous." The cod fleet returned with only about a 60-percent capacity load and owners sustained large losses.

The bad weather which prevailed through Western Europe during the last quarter of the year took its toll in Portuguese fishing. Two trawlers collided and sank on October 22, with a loss of two lives. A large number of small fishing craft were damaged and a few lost, but the most serious economic effect was from the fishing days lost. For a number of days the weather at fishing ports was so rough that the Portuguese Coast Guard forbade fishing. While the total number of such days was not large, it was a serious matter for the fishermen, who have no savings to fall back upon.

The "Fund for the Renovation and Equipment of the Fishing Industry," the extension of which was reported earlier, was authorized a loan in November 1959, of 50,000,000 escudos (US\$1,750,000) with which to continue its current operations.

The sardine catch through August was about 14 percent less than in 1958. The 1958 catch, however, was one of the largest on record, so the comparison is somewhat misleading. From trade and government information, however, it seems that the trend in the last four months of 1959 was downward, and that the 1959 catch will be lower than the recent average.

Exports of canned fish, chiefly sardines, anchovies, and tuna were at a high level in 1959, partly reflecting the abundant 1958 sardine catch. Through November, about 70,000 metric tons valued at \$35.9 million were exported. Of these, about 76 percent were canned sardines. Portugal's anchovy exports to other European countries, notably France and Italy, increased significantly in 1959.

Portugal faces a difficult problem with its supply of dried cod this year. On top of a poor year in 1958/59, the 1959 catch is estimated to be even worse, and the supply of dried cod available in world markets is limited. After the late return of the fleet from the banks in the third week of October, and the confirmation of the poor catch, the Secretary of State for Commerce called a press conference on October 27, 1959, regarding the cod supply. The Secretary assured the press that existing ceiling prices would be maintained and that steps would be taken to ensure a regular supply of dried cod. However, an increase was permitted on December 16, 1959, in the prices of the highest grade only of domestic and imported dried cod. He stated, there was no need for hoarding and speculation would be promptly and rigorously punished. The Government has from time to time since October 1959 announced the release of quantities of dried cod to dealers. Nevertheless, stores have only barely adequate supplies, and the press has reported frequent instances of attempted hoarding by dealers, and of under-the-counter and tied sales. The Government, for its part, is apparently making its best efforts to sustain an orderly flow of this key product--at ceiling prices--to consumers. Since the shortage developed toward the end of 1959, and other countries with cod industries are concentrating more and more upon frozen fish, Portugal has been unable to obtain sufficient imported

Portugal (Contd.):

cod to take care of the shortage. Imports of dry and wet cod through November 1959 were 22 percent less than imports in the first 11 month of 1959, the United States Embassy in Lisbon, reported on January 27, 1960.

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FISHERIES TRENDS,
NOVEMBER 1959:

Sardine Fishing: During November 1959, the Portuguese fishing fleet landed 17,604 metric tons of sardines (valued at US\$1,346,156 ex-vessel or about \$76 a ton). In November 1958, a total of 26,767 tons of sardines was landed (valued at \$1,603,930 ex-vessel or \$60 a ton).

Canneries purchased 41.6 percent or 7,332 tons of the sardines (valued at \$633,530 ex-vessel or about \$86 a ton) during November 1959. A total of 10,044 tons was purchased for the fresh fish market, and 228 tons were salted.

Other Fishing: November 1959 landings of fish other than sardines were principally 3,340 tons of chinchards (value \$156,730). (*Conservas de Peixe*, January 1960.)

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CANNED FISH PACK,
JANUARY-NOVEMBER 1959:

The total Portuguese pack of canned fish for January-November 1959 amounted to 56,142 metric tons. Canned sardines in oil (43,985 tons) accounted for 78.3 percent of the January-November 1959 pack, the January 1960 *Conservas de Peixe* reports.

Portuguese Canned Fish Pack, January-November 1959			
Product	Net Weight		
	Metric Tons	1,000 Cases	
In Olive Oil:			
Sardines	43,985	2,315	
Sardinelike fish	617	32	
Anchovy fillets	5,201	520	
Tuna	4,424	158	
Mackerel	582	71	
Other species	1,333	71	
Total	56,142	3,119	

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CANNED FISH EXPORTS,
JANUARY-NOVEMBER 1959:

Portugal's exports of canned fish January-November 1959 amounted to 69,752 metric tons (3,801,000 cases), valued at US\$35.7 million, as compared with 58,938 tons, valued at US\$31.4 million, for the same period in 1958. Sardines in olive oil exported during the first 11 months of 1959 amounted to 52,906 tons, valued at US\$25.6 million.

Portuguese Canned Fish Exports, January-November 1959			
Species	Jan.-Nov. 1959		
	Metric Tons	US\$	
Sardines in olive oil	52,906	25,597	
Sardine & sardinelike fish in brine	1,449	302	
Tuna & tunalike fish in olive oil	3,759	2,631	
Anchovy fillets	5,899	4,325	
Mackerel in olive oil	3,187	1,603	
Other fish	2,552	1,232	
Total	69,752	35,690	

During January-November 1959, the leading canned fish buyer was Germany with 15,115 tons (valued at US\$7.6 million), followed by Italy with 9,628 tons (valued at US\$5.4 million), United States with 6,758 tons (valued at US\$4.6 million), Great Britain with 6,755 tons (valued at US\$3.1 million), and Belgium-Luxembourg with 4,507 tons (valued at US\$2.2 million). Exports to the United States included 2,464 tons of anchovies, 944 tons of tuna, 3,135 tons of sardines, and 40 tons of mackerel. (*Conservas de Peixe*, January 1960.)



South-West Africa

DISPUTE OVER WAGES FOR SPINY
LOBSTER FISHERMEN SETTLED:

The dispute over higher wages for 300 Portuguese spiny lobster fishermen in Luderitz, South-West Africa, was settled in February. Details of the final settlement are not known. The fishermen were seeking an increase from 9 shillings (US\$1.26) per 100 pounds of spiny lobster landed to £1.4.0d. (\$3.44). Other payments received by the fishermen were not involved in the dispute. These include a bonus of 3-4 shillings (42-56 U. S. cents) per 100 pounds, wages of up to £50 (US\$140) a month, and a food allowance of £8-£10 per month (US\$22.40-28.00).



Sweden

EUROPEAN COMMON MARKET CREATES EXPORT PROBLEMS FOR FISHERY PRODUCTS:

In the light of the development towards increasing exports which the Swedish fishing industry has shown in the last years, it is natural that most of the problems for commercial fishermen are on the international level, said the Swedish Minister of Agriculture in a speech on March 18 which was "Fisherman's Day" of the Agricultural Week.

The minister also said that apart from normal risks, which always exist because of the technical and economic development, the largest risk arising out of West German's connection with the European Common Market seems to be that this group gradually will introduce a common outer customs barrier. According to present plans, this would in a few years cause increasing sales difficulties for Swedish fish to West Germany, or seriously reduce the profit for that part of the fishing industry concentrating on this market. However, this development, the minister stated, is very difficult to judge.

The minister said further that in the Convention of the European Free Trade Association (EFTA), the special regulations pertaining to fishery are limited to a general aim. The purpose, he said, is to ease the development in the trade with fish and similar products, which give other member countries, whose economy is depending on such export, a reasonable reciprocity. The abolishment of customs protection, he said, affects the duties on canned fish products, and as respects frozen fish fillets, the EFTA Convention gives a certain room for increased Swedish export. From this point of view, he said, the EFTA Convention is more advantageous to the Swedish fishing industry than the proposed Nordic market, where the import fees would have been abolished immediately. The EFTA Convention, on the other hand, provides for a gradual abolishment over a ten-year period. (United States Consulate in Goteborg, reported on March 22, 1960.)

TEN STEEL TRAWLERS ORDERED FROM EAST GERMAN SHIPYARD:

A Goteborg firm has signed a contract with a shipyard in Brandenburg, outside of East Berlin in East Germany, for delivery of 10 steel trawlers. The trawlers will be of a special type, called "Schwedenskutter" (Sweden cutter), each with a total length of 104 feet and a width of about 22 feet. They will be equipped with 560-horsepower 4-stroke Diesel engines and will also have radar, echo-sounding devices, and radiotelephones. Two 16 kilowatt generators will furnish each trawler with electricity for heating and cooking purposes. Auxiliary motors of 28 horsepower will also be installed. The loading capacity is 1,500 boxes of fish.

Deliveries are scheduled to be made during a period of one year with the first trawler completed in the beginning of 1961.

The transaction, which represents an amount between 5 and 6 million crowns (US\$965,000-1,158,000) provides for increased export of Swedish fish to East Germany. A contract for export of 2,000 metric tons of North Sea herring during the month of July and 500 metric tons of mackerel has been signed.

The background to the order for the ten steel trawlers is that Sweden's export of fish to East Germany in the last years has been rather irregular. In October 1959 for instance, export of fish to East Germany stopped because Sweden had discontinued importing fodder products, brown coal, and grain from East Germany as provided for in the global compensation arrangement for 1959. As a result of the uncertain export opportunities, Swedish representatives for the fishing industry sought to find other products that Sweden could import from East Germany. There is at present a demand for modern steel trawlers in Sweden. Several orders have been placed outside of Sweden, for instance in Holland. No orders, however, have previously been placed in East Germany by Swedish fishermen. However, it is reported that Danish fishermen have contracted for a similar type trawler for delivery in the summer of 1960.

Sweden (Contd.):

The company that has contracted for the trawlers is canvassing Swedish fishermen seeking to obtain sales contracts for the ten steel trawlers. (United States Consulate, Goteborg, report of March 8, 1960.)

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FISHERY LANDINGS IN 1959:

The total catch of Swedish fishermen in 1959 totaled 260,000 metric tons, valued at 163,000,000 crowns (US\$31.5 million), compared with 238,000 tons (revised), valued at 154,000,000 crowns (\$29.7 million) in 1958. This set new records both for quantity and value.

West coast fishermen landed 75 percent of the total quantity and 70 percent of the total value. South coast fishermen accounted for 14 percent of the quantity and 16 percent of the value, and the share of the east coast fishermen amounted to 11 percent of the quantity and 14 percent of the value.

The increase in quantity originates from the west coast; the increase on the east coast was significant, while the landings by south coast fishermen dropped by 2,200 tons.

The value of the landings by west coast fishermen increased by 7,400,000 crowns (\$1.4 million); the value for east coast fishermen increased by 400,000 crowns (\$77,200) and the landings by south coast fishermen represented a gain of 1,200,000 crowns (\$231,600). The increase in value on the south coast, despite the reduced landings, is explained by increased landings of more expensive fish, such as eel.

In comparing total landings as far back as 1939 with 1959, it is noticeable that the catch during the 20 years has increased by more than 200 percent. In 1939, west coast fishermen landed 75,000 tons as compared with 192,000 tons in 1959; south coast fishermen landed 12,000 tons in 1939 as against 36,800 tons in 1959; east coast fishermen landed 32,000 tons in 1939 compared with 27,800 tons in 1959.

During the same period the number of full-time fishermen dropped from 13,600 to 9,500. The catch per fisherman in 1959 is three times as much as in 1939. Larger boats with powerful engines, modern and more efficient gear, and new fishing methods account for the largest part of the increase, but a more intensive use of craft and gear is also a factor.

Exports of fish and fish products in 1959 also reached a new record and totaled 122,000 tons, valued at 76,500,000 crowns (\$14.8 million). Direct landings in foreign ports, included in the above total, amounted to 80,000 tons, an increase of 17,000 tons and 7,000,000 crowns (\$1.4 million) compared with 1958.

Imports of fish and fish products in 1959, dropped to 47,300 tons, valued at 105,400,000 crowns (\$20.3 million), compared with 49,200 tons, valued at 105,900,000 crowns (\$20.4 million), in 1958. (United States Embassy, Goteborg, report of March 15, 1960.)

Note: Values converted at rate of one Swedish crown equal \$0.193.

**Taiwan**FISHERIES LANDINGS IN 1959:

The 1959 fishery landings in Taiwan reached 246,327 metric tons, an increase of 7.25 percent over 1958 landings of 229,677 tons. The catch by categories as compared with 1958 is shown in the table.

Taiwan's Fishery Landings, 1957-59			
Type of Fishery	1959	1958	1957
	(Metric Tons)		
Deep-sea fisheries . . .	76,411	61,160	52,223
Inshore fisheries . . .	91,240	81,720	71,552
Coastal fisheries . . .	32,183	38,267	38,468
Fish culture . . .	46,493	48,530	45,878
Total	246,327	229,677	208,121

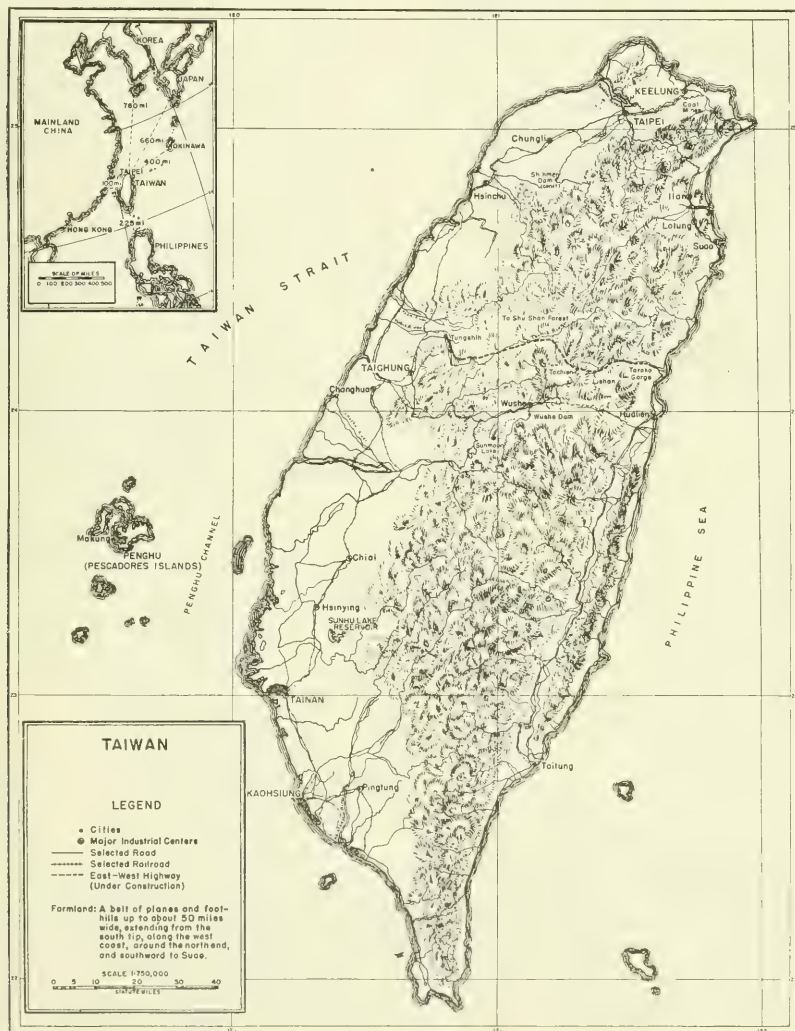
Over 70 percent of the 1959 production was contributed by the deep-sea and inshore fisheries and the remaining 30 percent by coastal fisheries and fish culture. This is in contrast to the production of 1952 in which the deep-sea and inshore fisheries accounted for only 40 percent of the total catch. The drop in

Taiwan (Contd.):

landings from the coastal fisheries is attributed to the motorization of many sampans which placed them in the in-shore fisheries. Fish-culture production in 1959 was set back by the serious flood of August 7.

The 1959 fishery catch exceeded the planned goal of 242,000 tons. The new goal set for fisheries production in 1960 is 255,000 tons.

OUTLOOK FOR TUNA FISHING BRIGHT: Encouraged by the successful operation of the four 350-ton tuna long-



Taiwan (Contd.):

liners built in 1957, the fishing industry is planning the construction of two 550-ton tuna boats in 1960. Export of frozen tuna to the United States amounted to 688 tons in 1959 as compared to 146 tons in 1958.

USE OF CHEMICAL FERTILIZERS IN MILKFISH PONDS: With the successful demonstration of the application of chemical fertilizers in milkfish ponds conducted by the Taiwan Fisheries Research Institute, the fish-pond operators in Taiwan have applied to the local Fertilizer Distribution Administration for a total of 1,505 tons of ammonium sulphate and 587 tons of superphosphate. The use of chemical fertilizers has proved to be more economical and sanitary than the use of natural fertilizers such as rice bran, soybean meal, or night soil.

--By T. P. Chen, Chief, Fisheries Division,
Joint Commission on Rural Reconstruction,
Taipei, Taiwan.

Note: See Commercial Fisheries Review, April 1959,
p. 90.



Union of South Africa

PILCHARD-MAASBANKER FISHERY OFF TO GOOD START:

Both Maasbanker and pilchards have been caught in reasonable quantities in the first six weeks of the Union of South Africa Cape shoal fishing season. According to reports from some factories, the January total is likely to be one of the best on record for that month, and the maasbanker or jack mackerel fishing early in February was a hopeful sign for the canners.

Pilchards are once again being found south of the main concentration of processing factories; the shoals are reported to spread over a wide area and catches have been made from near Dassen Island to False Bay. Maasbanker are being taken in the Saldanha and Lambert's Bay areas.

An increase in the proportion of good canning fish may prove a boon to Cape factories. With the Peru production in

1959 adding nearly 20 percent to world fish meal output, the export price has taken a drastic plunge and may be some time recovering. The price drop is serious, but, like other raw materials, fish meal could gain from it, according to the South African industry.

For the Union, South-West Africa, and Angola the fish meal price drop may cause a tightening of fishing industry belts and an even greater emphasis on economy in fishing and processing. Hard as this may be at the moment, it could have a long-term beneficial effect both on producers and on the world demand for their product.

In the ten years from 1948 to 1957 world fish meal production soared from 96,900 tons to 523,200 tons. Demand has grown with production and the high nutritive value of fish meal is being increasingly realized by farmers and animal feeds manufacturers. But the market has only been touched in the more developed countries. A fall in price could bring in more buyers and the surplus of today could become a shortage of tomorrow as Peru reaches the limits of its production. Consumers coming in at the lower prices may stay with the increase which will have to come if fishermen and factory operators are to receive a fair return for their work and their investments. (The South African Shipping News and Fishing Industry Review, February 1960.)



U. S. S. R.

FISHING MOTHERSHIPS AND FACTORYSHIPS TO BE BUILT BY POLAND:

A "large number" of 10,000-ton motherships for fishing vessels and 1,250 deadweight tons of fishing-processing vessels have been ordered from Poland by the U. S. S. R.

This information appeared in an article in the Polish periodical Trybuna Ludu of February 29 which announced that Polish shipyards had received the largest single order thus far placed in Poland by the U. S. S. R. for a total of 122 ships amounting to 830,000 tons for construction during

U. S. S. R. (Contd.):

1961-1965, i.e., the period of the next Polish five-year plan as well as the five-year Polish-Soviet Trade agreement, which was expected to be signed soon.



United Kingdom

GOVERNMENT TO AID HERRING FISHERMEN WHEN CATCHES SOLD FOR FISH MEAL:

In the House of Commons of the British Parliament, the Secretary of State for Scotland was asked if "he was aware of the falling price of fish meal brought about by excessive and unrestricted imports of Peruvian fish meal; and what steps he is taking to protect herring fishermen, whose catches frequently go to fish meal, from bearing the losses involved."

The reply was that the Secretary was aware that the increase in the production of fish meal in Peru has had a considerable effect on the world market for fish meal. This has affected the operations of the Herring Industry Board, which has informed the Government of its difficulties.

Pending a full review of the situation, the Board has been told that, if necessary, the Government will meet its losses on its oil and meal arrangements up to £30,000 (US\$84,000) during the period January 1-May 31, 1960, so that during

that period the schedule of prices which the Board pays to the fishermen for surplus herring which is sold for reduction may be maintained. (Report of March 17, from United States Embassy, London.)

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AIRCRAFT CARRIERS AS FISHERY FACTORYSHIPS:

Two aircraft carriers are to be used as factoryships to service the British deep-sea trawling fleet. The carriers have been purchased, along with an old repair ship, by a British company formed in London. Behind the venture is a firm of shipbrokers and managers, which has been working on the project for nearly a year. Capital amounting to more than £2.5 million (US\$7 million) is behind the plan.

The aircraft carriers are the Ocean and the Theseus, both 13,000 tons, and the repair ship, Ranpura (16,000 tons). Equipment from the latter will be used in the conversion of the carriers and thereafter she will be scrapped.

Helicopters will be used to transfer catches from trawlers to the motherships, each of which will make four 90-day round trips in a year. On board the motherships the fish will be quick frozen. Products will be sold to distributors on a contract basis.

The firm estimates that 50 trawlers will be required to service each carrier. Trawler owners seem to realize that the plan is an excellent one and that it would



The 13,000-ton aircraft carrier Theseus to be used as factoryship to service British deep-sea trawling fleet.

United Kingdom (Contd.):

allow their vessels to spend more time on the fishing grounds.

In addition to acting as factoryships, the carriers, each with a complement of 425, will act as servicing ships supplying the catching vessels with fuel, ice, and other requirements. They will have what are described as "shore amenities" for the trawlermen.

The trawlermen's trade union has been consulted on matters affecting pay and conditions. (*The Fishing News*, February 19, 1960.)



Venezuela

RESEARCH ON SARDINE STOCKS PLANNED:

A British marine fisheries biologist is working in Venezuela on a year's assignment for the Food and Agriculture Organization in order to assist the Government of Venezuela to set up a research program to investigate the stocks of sardines and other commercial fish found in the Gulf of Cariaco and in other Venezuelan waters.

The present thriving sardine fishery in Venezuela produces fish for the canning factories and it is hoped that the research program will be able to determine to what extent the fishery may be developed without danger to the stocks.

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FISHERIES TRENDS, FEBRUARY 1960:

The Venezuelan Banco Agricola y Pecuario announced in February that the Fishing Cooperative of Zulia will receive a loan of 1.5 million bolivares (about US\$485,000) for housing, nets, and other fishing equipment. The principal objective of these loans, according to the Director of the Bank, is to reduce the price of fish and help the small fisherman. The Bank also is planning to organize a cooperative of fishermen in eastern Venezuela which will also receive a credit of 1.5 million bolivares.

The new marine biology institute will be inaugurated in the near future on the island of Margarita to study (1) Venezuela's fishery resources, (2) the importance and possibility of modernization, (3) the possibility of new employment sources, and (4) the possibility of lowering the cost of living by introducing fishery products.

Wholesale trawling by the large commercial fishing and canning companies again came under attack from small fishermen in December 1959. The latter claim that trawling is depleting their fishing grounds and thus affecting their livelihood. The government, on the other hand, felt it necessary to extend its permission another four months (until April) for trawling in certain areas of Venezuela's seacoast. Otherwise, a spokesman said, a fish shortage would occur and 3,000 employees in the industry would be without work. The government believes that one answer to the problem is the fishing cooperatives which would permit the small fisherman to compete with trawling gear.

The first 50 tons of tuna were delivered by Japanese fishing boats to a Venezuelan cannery during July 1959. The boats belong to a joint Venezuelan and Japanese company (majority of capital is Venezuelan). The company expects to deliver 30 tons of tuna to the Margarita cannery every 10 days. The cannery expects ultimately to supply the entire Venezuelan market at prices no higher than imported tuna. (United States Embassy in Caracas reported in a despatch dated February 15, 1960.)



Viet-Nam

REARING OF MILKFISH ON COMMERCIAL SCALE DEVELOPING RAPIDLY:

The pond rearing of milkfish (chanos), which was started in Viet-Nam late in 1958, on a commercial scale, is developing rapidly in Central and South Viet-Nam. During 1959 two rearing stations were developed by the Fisheries Directorate and over 100,000 milkfish fry were captured for rearing purposes. In 8

Viet-Nam (Contd.):

months, 10,000 fry will yield about 6 metric tons of prime marketable fish.

A number of privately-owned commercial rearing ponds have now been built and others are under construction this year. All are designed similar to those built by the Inland Fisheries Culture Service.

As surveys reveal additional areas of fry concentration in coastal brackish waters, up to a million milkfish fry may be captured by 1962.

In Taiwan, where the rearing of milkfish has been conducted for the past 30 years, it is the most important pond fish and is one of the leading food fishes.

The magnitude of the Taiwan milkfish industry may be judged by noting that between 90 and 100 million fry are captured annually for pond-rearing purposes with 118 million being the record catch. The pond-rearing area exceeds 13,000 hectares (about 32,123 acres).

Pilot-rearing stations established during 1959 indicate that the vast mangrove swamp area of coastal Viet-Nam is admirably suited for milkfish rearing. The limiting factors will be the ability of the Fisheries Directorate to discover sufficient milkfish spawning areas and the development of techniques for catching them in volume, the United States Overseas Mission to Viet-Nam reported on February 18, 1960.

**TESTS SHOW FISH AVOID FATIGUE**

Encouraging results have been obtained relative to the degree of fatigue fish experience during lengthy ascents of fishways. In the summer of 1959, tests were conducted by U. S. Bureau of Commercial Fisheries biologists to examine the ability of salmonoids to make extended ascents of fishways with slopes of 1 on 8 and 1 on 16. These ascents ranged from 200 to 1,000 feet. Whole blood extracts were obtained from each fish immediately following the exercise period. These samples were then analysed.

In general the results imply that salmonoids do not become excessively fatigued in the ascent of either a 1 on 8 or 1 on 16 slope fishway even when the height achieved is up to 1,000 feet.

Editorial Assistant--Ruth V. Keefe

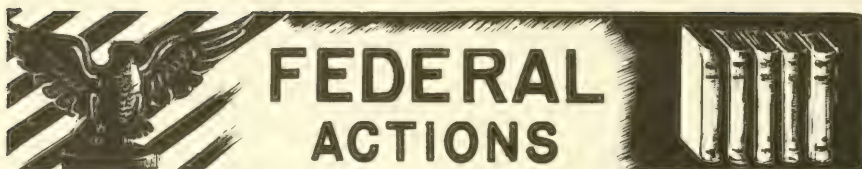
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Cover--Pat Morin, FAO; p. 12, figs. 2 and 3--J. P. Cating; p. 27--Basil L. Smith System, Phila., Pa.; p. 36--Corps of Engineers, U. S. Army, New England Division; p. 37, figs. 2 and 3--(Canadian) Trade News, February 1960; pp. 41 and 44--Information Services, Dept. of Fisheries, Ottawa; pp. 48-49--M. Routh, FAO; p. 60--W. Williams, FAO.



Committee for Reciprocity Information

1960 CONSULTATIONS ON FOREIGN IMPORT RESTRICTIONS:

The Committee for Reciprocity Information (CRI) has invited public views on the use of import restrictions by other countries which hamper the trade in United States products. Consultations are to be conducted during 1960 under the General Agreement on Tariffs and Trade (GATT) with the following member countries which have imposed restrictions for balance of payments reasons:

May 1960	July 1960	October 1960
Austria	Finland	Australia
Brazil	France	Burma
Denmark	Ghana	Ceylon
Greece	Israel	Chile
India	Norway	Indonesia
Malaya	Sweden	Japan
Uruguay	Turkey	New Zealand
	Yugoslavia	Pakistan
		Rhodesia/Nyasaland

The consultations will afford the United States an opportunity to discuss moderation of particular policies and practices of other countries that have proved unduly burdensome to United States exporters.

United States firms or associations having an interest in exporting to the consulting countries may, as a result of their experience, have information which would be useful to the United States Government in the consultations. Such information as (1) import restrictions causing unnecessary damage to commercial interests, (2) complex and arbitrary licensing procedures, (3) inadequate information available to traders on import regulations, or (4) discrimination in the treatment of goods available from the United States in favor of goods from other countries, is useful.

Written statements concerning problems caused by import restrictions in

the countries listed were to be submitted to the Committee for Reciprocity Information, Tariff Commission Building, Washington 25, D. C. Statements were due April 15, 1960, for those countries consulting in May; May 15, 1960, for those countries consulting in July and are due August 15, 1960, for those countries consulting in October.



Department of Health, Education, and Welfare

FOOD AND DRUG ADMINISTRATION

A NUMBER OF REGULATIONS REGARDING FOOD ADDITIVES ISSUED:

The food additives amendment to the Federal Food, Drug, and Cosmetic Act (secs. 409, 701, 72 Stat. 1785, et seq.; 21, U. S. C. 349, 371) became effective on March 6, 1960, according to a statement of policy issued by the U. S. Food and Drug Administration and published in the December 31, 1959, *Federal Register*. However, this date may be and has been extended on a product-by-product basis for a time not to exceed 12 months "on the basis of a finding that such extension involves no undue risk to the public health and that conditions exist which necessitate the prescribing of such an additional period."

This means that hundreds of chemicals now found in foods must be approved by the Food and Drug Administration before they can be used. Law applies to all food chemicals introduced prior to January 1, 1958. Prior to that time any substance could be added to food and it couldn't be banned unless the Government proved it harmful. Now the chemicals may be used only if their manufacturer or promoters prove to the Food and Drug Administration that they are harmless. Food and Drug already has issued a number of orders listing food additives or substances generally recognized as safe, and other orders regarding food additives.

In the *Federal Register* of November 20, 1959, a list of about 185 substances that are generally recognized as safe was issued. This order indicated that it is impracticable to list all substances that are generally recognized as safe for their intended use. However, by way of illustration, the Agency regards such common food ingredients as salt, pepper, sugar, vinegar, baking powder, and monosodium glutamate as safe for their intended use. Also listed were certain chemical preservatives, buffers and neutralizing agents, emulsifying agents, nonnutritive sweeteners, nutrients, sequestrants, stabilizers, anticaking agents, etc. Most of the chemicals or substances listed are used to improve the color, flavor, texture, appearance, nutritional value, and keeping quality of foods. The order became effective on December 20, 1959.

A list of about 70 spices, seasonings, essential oils, oleo-resins, and natural extracts that are generally recognized as safe for intended use, appeared in the January 19, 1960, Federal Register. This order became effective upon publication.

A list of substances and chemicals supplementing the list published in the Federal Register of November 20, 1959, was proposed and published in the Federal Register of February 2, 1960. The proposal listed certain substances generally recognized as safe within the meaning of the Act, and interested persons were requested to present their views. Included were certain chemical preservatives, buffers and neutralizing agents, nonnutritive sweeteners, nutrients, stabilizers, anticaking agents, etc.

The use in foods of certain additives for which tolerances have not yet been established or petitions therefor denied was authorized by an order published in the Federal Register of February 27, 1960. The listed additives may be used in food, under certain specified conditions, for a period of one year from March 6, 1960, or until regulations shall have been issued establishing or denying tolerances or exemptions from the requirement of tolerances, in accordance with the Act. Effective upon publication. In the Federal Register of March 5 a correction to the order issued in the February 27 Federal Register appeared. The correction corrected the listing of certain items.

Chemicals and substances (about 67 items) used in manufacture of paper and paperboard products for food packaging were listed in a proposal issued and published in the Federal Register of March 1. The substances listed in the proposal were those generally recognized as safe and those migrating to food from paper and paperboard products used in food packaging. Interested persons were requested to submit their views.

In the Federal Register of March 17 an order appeared extending the time during which certain container-lining ingredients may be used. The order authorizes continued use of lining ingredients comprising all categories of materials entering into lining formulations, insofar as they may be food additives, on the ground that no imminent risk to health is involved and that additional time is needed to appraise the entire list. Also involved is the consideration that a minimum quality of any of the materials will be imparted to food, consistent with good manufacturing practices. Effective on publication.

Also in the March 17 Federal Register appeared an order extending the effective date for certain specified food additives as direct additives to food and certain additives as indirect additives to food. Became effective on publication. Also in the same issue was an order authorizing the use in foods of certain additives for which tolerances have not yet been established or petitions therefor denied, specifically substances migrating from adhesives used in food packaging. Effective on publication.

A notice appeared in the Federal Register of March 19 filing a petition for a regulation establishing tolerances for calcium disodium (ethylenedinitrilo) tetraacetic acid in cooked, canned shrimp and crab meat. Also in the same issue appeared a notice filing a petition for a regulation establishing tolerance for 66 nylon resin and 610 nylon resin in food-handling equipment other than for milk.

A notice appeared in the Federal Register of March 23, filing a petition for a regulation providing for the use of vinylidene chloride polymer dispersion-coated cellophane films in food packaging.

A notice appeared in the Federal Register of March 25, filing a petition for a regulation to provide for the use of sources of radiation-producing X-radiation at energy levels of 300 kv.-peak, or lower, for the purpose of inspection of foods, food packages, and for controlling food processes.

Many regulations affecting food additives are being issued in accordance with the recent changes in the Federal Food, Drug, and Cosmetic Act. Those interested in complete details should write directly to the Food and Drug Administration, Washington, D. C., or directly to the local office of that Agency if one is located in your area.

* * * * *

PETITION FILED FOR REGULATION ON TOLERANCES FOR CHEMICAL USED IN CANNED SHRIMP AND CRAB MEAT:

A petition has been filed with the U. S. Food and Drug Administration for issuance of a regulation establishing tolerances for calcium disodium (ethylene-dinitrilo) tetraacetic acid in cooked, canned shrimp and crab meat, pursuant to the provisions of the Federal Food, Drug, and Cosmetic Act. Petition filed by a Port Royal, S. C., fishery firm proposes a tolerance of 180 parts per million (0.018 percent) of the chemical when added to cooked, canned shrimp for the intended purpose of controlling struvite formation, discoloration, and softening; and a tolerance of 200 parts per million (0.020 percent) in cooked, canned crab meat for the intended purpose of controlling struvite formation and discoloration.

The notice of the filing of the petition appeared in the March 19 Federal Register.



Department of the Interior

FISH AND WILDLIFE SERVICE

SEASON CHANGED FOR LAND-BASED WHALING FOR BALEEN WHALES:

The six-months season for land-based whaling for baleen whales by United States nationals and whaling enterprises has been changed by the Secretary of the Interior. The change, as it appeared in the Federal Register of April 6, 1960, shows that the opening date of the season has been advanced two weeks and the closing date has been advanced two weeks. This change was requested by the industry to take advantage of relatively better weather conditions during the early spring. Any resulting increase in the take of whales will be too small to affect significantly the conservation of the whale resources.

Section 151.20 (Whale catchers attached to land stations taking baleen whales) has been amended as follows: "It is forbidden to use a whale catcher attached to a land station for the purpose of taking or killing blue whales or minke whales,

except during the period April 16 to October 15 following, both days inclusive."

The Whaling Convention Act of 1949 authorizes the Secretary of the Interior to adopt such regulations as may be necessary to carry out the purposes and objectives of the Convention for the Regulation of Whaling. In accordance with that authority, the Secretary on April 12, 1956, issued whaling regulations to give effect to Articles V, VII, VIII, and IX of the Convention as they apply to nations and whaling enterprises of the United States.



Treasury Department

BUREAU OF CUSTOMS

CLARIFICATION ON APPLICATION OF TARIFF ON FISH BLOCK IMPORTS:

Recently the U. S. Bureau of Customs classified a shipment of imported fish fillet blocks containing only whole fillets of groundfish under Tariff Paragraph 717(b), the category under which groundfish fillets are dutiable. The latter part of 1959, a New York Customs Court's decision (Lee Herrmann Company A/c The Coldwater Seafood Corporation vs. United States) ruled that imported fish blocks made from groundfish are dutiable under Tariff Paragraph 720(b) instead of under Paragraph 717(b) under which groundfish fillets are dutiable. This decision became effective September 15, 1959.

However, under the most recent decision of Customs in classifying the shipment of fish blocks indicated above, all imports of fish blocks, for further processing, must contain a reasonable amount of bits, pieces, and trimmings. It has been indicated that 2 percent of bits, pieces, and trimmings will satisfy the Bureau of Customs. This means that Customs interprets the decision of the Customs Court in the case cited above as requiring the presence of some bits and pieces in order for the blocks to be classified under the 1-cent-a-pound (when weight of contents together with immediate container is 15 pounds or

more) or duty provisions of Tariff Paragraph 720(b). Blocks not containing the required amount of bits and pieces will be classified under the fillet provisions of Tariff Paragraph 717(b) at 1-7/8 cents and 2-1/2 cents a pound.

Note: Also see *Commercial Fisheries Review*, Jan. 1960 p. 95 and Dec. 1959 p. 102.

GROUND FISH FILLET IMPORT TARIFF-RATE QUOTA FOR 1960:

The reduced-tariff-rate import quota on fresh and frozen groundfish (cod, haddock, hake, pollock, cusk, and ocean perch) fillets and steaks for calendar year 1960 is 36,533,173 pounds, the Bureau of Customs announced in the March 2 *Federal Register*. Divided into quarterly quotas this means that 9,133,293 pounds of groundfish fillets and steaks during each quarter of 1960 may be imported at the 1-7/8 cents-per-pound rate of duty, and any imports over the quarterly quota will be dutiable at the rate of 2-1/2 cents a pound.

The reduced-rate import quota for 1960 is 1.0 percent less than the 1959 quota of 36,919,874 pounds. From 1951 to 1960 the quantity of fresh and frozen groundfish fillets permitted to enter the United States at the reduced rate of duty of 1-7/8 cents a pound has increased 24.7 percent.

Reduced-Tariff-Rate Import Quota for Fresh and Frozen Groundfish Fillets, 1951-1960	
Year	Quota
	1,000 Lbs.
1960	36,533
1959	36,920
1958	35,892
1957	37,376
1956	35,197
1955	35,433
1954	33,950
1953	33,866
1952	31,472
1951	29,290

Average aggregate apparent annual consumption in the United States of fresh and frozen groundfish fillets and steaks (including the fillet blocks and slabs used in the manufacture of fish sticks, but excluding fish blocks since September 15, 1959, and blocks of fish bits) for the three years (1957-1959) preceding 1960 was 243,554,489 pounds, calculated in accordance with the proviso to item 717(b) of Part I, Schedule XX, of the General Agreement on Tariffs and Trade (T. D. 51802). This was less than the average consumption of 246,132,491 pounds for 1955-56, and also less than the average of 249,170,004 pounds consumed in the 1954-56 period.

A decision by the United States Customs Court in 1959 held that fish blocks imported in bulk are dutiable at one cent a pound under Tariff Paragraph 720(b). Prior to that decision, fish blocks were classified under Paragraph 717 (b), the same as fish fillets. The change became effective September 15, 1959, and fish blocks imported in bulk since that date have been classified under Paragraph 720(b). Therefore, fish blocks imported since the effective date have not entered in the calculation of apparent annual consumption or the quota since only imports under 717(b) are considered in the calculation. In view of this, it is estimated that if fish blocks had remained under the 717(b) classification, apparent annual consumption for 1957-1959 would have been greater than that for the previous three-year period, and also the quota for 1960 would have been greater than that for 1959.

Note: Also see *Commercial Fisheries Review*, April 1959, p. 104.

U. S. IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA PROVISIO FOR 1960:

The quantity of tuna canned in brine which may be imported into the United States during calendar year 1960 at the 12½ percent rate of duty is limited to 53,448,330 pounds. This is 2.1 percent more than the 52,372,574 pounds in 1959, 19.6 percent more than the 44,693,874 pounds in 1958, and 17.6 percent more than the 45,460,000-pound quota for 1957. Any imports in excess of the 1960 quota will be dutiable at 25 percent ad valorem.

Any tuna classifiable under Tariff Act paragraph 718(b)--fish, prepared or preserved in any manner, when packed in airtight containers. . . (except fish packed in oil or in oil and other substances; . . .)--which is entered or withdrawn for consumption is included.

A proclamation (No. 3128), issued by the President on March 16, 1956, gave effect to an exchange of notes with the Government of Iceland to withdraw tuna canned in brine from the 1943 trade agreement and invoked the right to increase the duty reserved by the United States in negotiations with Japan and other countries under the General Agreement on Tariffs and Trade. The quota is based on 20 percent of the previous year's United States pack of canned tuna.

The notice was published in the April 2, 1960, Federal Register.



White House

PRESIDENT APPROVES NORTH PACIFIC HALIBUT REGULATIONS FOR 1960:

The regulations of the International Pacific Halibut Commission adopted pursuant to the Pacific Halibut Fishery Convention between the United States and Canada (signed March 2, 1953) were approved by the President of the United States on March 24, 1960. The regulations were published in the Federal Register of April 6, 1960.

Note: Also see Commercial Fisheries Review, April 1960 p. 33.



Eighty-Sixth Congress (Second Session)

Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions, hearings, and other chamber actions by the House and Senate, as well as signature into law or other final disposition are covered.



CHEMICAL PESTICIDES COORDINATION ACT: H. R. 11502 (Wolf), introduced in House on March 31, a bill to provide for advance consultation with Fish and Wildlife Service and with State wildlife agencies before the beginning of any Federal program involving the use of pesticides or other chemicals designed for mass biological controls; to the Committee on Merchant Marine and Fisheries.

COLOR ADDITIVES IN FOOD: The House Committee on Interstate and Foreign Commerce on March 11, 1960, heard testimony of representatives of the Department of Agriculture on H. R. 7624 and S. 2197, color additives bills. The Committee adjourned subject to call of the Chair.

FISH AND WILDLIFE LEGISLATION: The Subcommittee on Fish and Wildlife of the House Committee on Merchant Marine and Fisheries held hearings March 22-23, 1960, and heard testimony from various public witnesses on S. 1262, to establish a research program in order to determine means of improving the conservation of game and fish in dam reservoirs; and on H. R. 8613 and S. 2481, pertaining to fishing vessel mortgage insurance, the subcommittee heard testimony from the Director of the U. S. Bureau of Commercial Fisheries; also took up H. R. 7386 and S. 2053, re acceptance by U. S. of a fish hatchery in South Carolina.

The subcommittee, in executive session, reported to the full committee S. 2053, to provide for acceptance by the U. S. of a fish hatchery in the State of South Carolina; and also S. 1262 and S. 2481.

FISHERMEN'S BENEFITS: House on March 30 took up Executive Communication 2001, a letter from Assistant Secretary of State, transmitting texts of several International Labor Organization Conventions, which included the Convention (No. 112) concerning the minimum age for admission as fishermen and ILO Convention (No. 113) concerning medical examination of fishermen. These were adopted by the International Labor Conference at its 43rd session, at Geneva, June 19, 1959, pursuant to Article 19 of the Constitution of ILO (H. Doc. No. 365); referred to the Committee on Foreign Affairs.

GAME FISH CONSERVATION IN DAM RESERVOIRS: H. R. 11298 (Johnson of Calif.), introduced in House March 21, 1960, a bill to direct the Secretary of the Interior to establish a research pro-

gram in order to determine means of improving the conservation of game fish in dam reservoirs; to the Committee on Merchant Marine and Fisheries.

HYDROFOIL VESSEL: S. 3206 (Magnuson), a bill to authorize the construction of an oceangoing hydrofoil vessel in order to demonstrate the commercial application of hydrofoil seacraft; to the Committee on Interstate and Foreign Commerce; introduced in Senate March 15, 1960. Identical to S. 3126 (Bartlett), introduced in Senate March 1, 1960.

INTERIOR DEPARTMENT APPROPRIATIONS: On March 29, 1960, by unanimous vote of 78 yeas the Senate passed with amendments H. R. 10401, fiscal 1961 appropriations for the Department of the Interior, and related agencies, after adopting all committee amendments en bloc, which were thereafter considered as original text for purpose of further amendment. Senate insisted on its amendments, asked for conference, and appointed conferees.

Senate Report No. 1203, Interior Department and Related Agencies Appropriation Bill, 1961 (March 25, 1960, 86th Congress, Second Session, Report from the Committee on Appropriations to accompany H. R. 10401), 42 pp. printed. Contains appropriations for the Department of the Interior and related agencies for fiscal year 1960. Included are funds for the Fish and Wildlife Service and its two Bureaus totaling \$37,035,000, as recommended by the Committee. Office of the Commissioner \$342,000.

Bureau of Commercial Fisheries \$7,051,000 for the management and investigations of resources, with the following increases (total \$802,000) recommended by the Committee--exploratory fishing and gear development \$160,000 for the continuation of the south Atlantic exploratory program (from Cape Hatteras to Cape Canaveral) which was established in August 1959 with funds allocated from the Saltonstall-Kennedy program; pesticides research \$67,000; industrial fisheries research (menhaden, sardines, and herring) \$175,000; and tuna fisheries investigations \$400,000. For construction \$2,400,000--\$2,055,000 for the construction of a fishing research vessel to replace the recently decommissioned *Albatross III*; for Great Lakes \$85,000; design biological laboratory, Seattle, Wash., \$45,000; quarters construction, Brooks Lake, Alaska, \$35,000; dock repair and improvement, Woods Hole, Mass., \$60,000; station rehabilitation, Little Port Walter, Alaska, \$45,000; laboratory rehabilitation, Galveston, Tex., \$30,000; utility system improvement, Boothbay Harbor, Maine, \$20,000; bulkhead construction, Beaufort, N. C., \$25,000. For Fisheries Loan Fund \$250,000 for administering the program. General Administrative Expenses \$361,000. Administration of Pribilof Islands \$2,070,000, includes \$304,500 for the construction of new facilities on the islands and an additional \$18,500 for increased operating costs. These funds are derived from the receipts from the sale of fur skins and other products from the Islands.

Bureau of Sport Fisheries and Wildlife for the management and investigation of resources, with increases recommended as follows--\$25,000 for fishery management program to assist the tribes of Navajo, Hopi, Fort Apache, and Zuni Reservations in development of fisheries; \$10,000 for ini-

tiation of fish-farming research program; \$345,000 (includes \$250,000 for pesticide-wildlife relationships) for wildlife research; \$250,000 to initiate a program of marine sport fisheries research authorized by Marine Sport Fisheries Act in 1959. The budget estimate includes \$3,564,750 for activities that have previously been financed from funds made available from "Migratory Bird Conservation Account" (Duck Stamp Funds). For construction \$4,841,000--principally for hatchery facilities. General Administrative Expenses \$950,000, and includes \$311,800 for activities previously financed with funds from the "Migratory Bird Conservation Account."

Interior Department and Related Agencies Appropriations for 1961 (Hearings before a subcommittee H. R. 10401, a bill making appropriations for the Department of the Interior and related agencies for the fiscal year ending June 30, 1961, and for other purposes), 1,110 pp., printed. Contains text of testimony presented by Government representatives; certain Departmental and Commission reports; various statements, letters, and information submitted; and Committee recommendations.

MINIMUM WAGE INCREASE: H. R. 11229 (Buckley), a bill to amend the Fair Labor Standards Act of 1938 so as to increase from \$1 to \$1.25 the minimum hourly wage prescribed by section 6(a)(1) of that Act; to the Committee on Education and Labor; introduced in House March 17, 1960. Identical to H. R. 11080 (Gilbert), introduced March 11, 1960 and similar in purpose to H. R. 11431 (Gallagher), introduced in House March 29, 1960, and several other bills introduced during first and second sessions of the 86th Congress.

SALTONSTALL-KENNEDY ACT FUNDS REAPPORTIONMENT: H. R. 10939 (Rivers of Alaska), a bill to amend the Act of August 11, 1939, to provide that a percentage of the funds available under the Act shall be apportioned among the states and paid to certain state agencies for projects pertaining to commercial fisheries; to the Committee on Merchant Marine and Fisheries; introduced in House on March 7, 1960. Provides for reapportionment of a separate fund created for use of the Secretary of Interior. The following apportionment schedule would apply: (1) Forty-two percent of the funds shall be expended by the Secretary as provided in section 2(a) of the Saltonstall-Kennedy Act of 1954 (P. L. 466). (2) Fifty percent of the funds shall be apportioned by the Secretary among the States which manage a commercial fishery on a percentage basis determined by the ratio of the value of commercial raw fish landed within each State (regardless of where caught) plus the value of capital investments in all fishing industry property located within each State to the total value of all commercial raw fish landed in all participating States plus the total value of capital investments in all fishing industry property located within all participating States; funds so apportioned shall be made available to the State agencies with authority to regulate commercial fisheries, to be spent on any biological, technological, or other research projects pertaining to the commercial fisheries of such participating States which are approved by the Secretary and to develop locally unexploited fish products as set forth in section 2(a) of the Act. (3) Eight percent of the funds shall be available to pay administrative costs of the Secretary in carrying out his prescribed duties.

SEAWEEDES (GROUND, POWDERED, OR GRANULATED) ON FREE IMPORT LIST: The Senate on March 28 passed H. R. 5884, a bill to place ground, powdered, or granulated seaweeds on the free duty list. This would put all ground, granulated, or powdered seaweeds on the free list. At the present time crude or unmanufactured seaweeds are free of duty. Kelp, a form of seaweed, is free of duty also when ground, granulated, or powdered. H. R. 5884 would put all ground, granulated, or powdered seaweed in the same category as kelp. At the present time the duty is 5 percent. The uses are much the same, namely as a jelling, thickening agent in certain prepared foods and extracts, and is considered a raw material in those uses. Seaweeds manufactured beyond grinding would not be affected by the bill.

SECOND SUPPLEMENTAL APPROPRIATIONS: On March 24, 1960, the Senate passed H. R. 10743 (Thomas), second supplemental appropriations for fiscal year 1960. Includes for Fish and Wildlife Service, Bureau of Commercial Fisheries, an increase of \$55,000 to modify and improve docking facilities at Technological Laboratory, Pascagoula, Miss.

SHRIMP IMPORT DUTIES: H. R. 10961 (Herlong), a bill to amend the Tariff Act of 1930 to provide for the establishment of country-by-country quotas for the importation of shrimp and shrimp products, to impose a duty on all shrimp imported in excess of the applicable quota; to the Committee on Ways and Means; introduced in House on March 8, 1960. Similar in purpose to about 29 bills introduced during the first and second sessions of the 86th Congress. H. R. 10961 omits part of the language of H. R. 8769 (Herlong) which was introduced on August 24, 1959, during the first session of the 86th Congress. Similar to S. 3204 (Ellender et al), introduced in Senate March 15, 1960, a bill to amend the Tariff Act of 1930 to provide for the establishment of country-by-country quotas for the importation of shrimp and shrimp products, to impose a duty on all unprocessed shrimp imported in excess of the applicable quota, and to impose a duty on processed shrimp and prohibit its importation in excess of the applicable quota; to the Committee on Finance.

On March 18, the names of Senators Talmadge, Holland, Magnuson, Kerr, Gruening, and Bartlett were added as additional cosponsors of S. 3204, introduced by Ellender (for himself, Long of Louisiana, Eastland, Stennis, and Yarborough) on March 15, 1960.

S. 3204 directs establishment of initial quotas for processed and unprocessed shrimp, effective for year 1960. The initial quota by country cannot be less than the actual 1958 imports, or January-August 1959 imports, plus 50 percent, whichever is higher. A country with no history of importation would have a provisional quota of 100,000 pounds of shrimp. After the initial quota is established, the bill provides for a cumulative increase in country-by-country quotas for 5 years in order to determine the permanent quotas for each country. These annual quota increases range from 5 percent annually, compounded, for countries exporting more than 5 million pounds of shrimp to this country to 25 percent for those exporting less than 1 million pounds. At the end of the 5 years, a permanent basic quota for each country will be calculated under this formula: First, the average annual importations for the years 1960 to 1964, inclusive, not counting any year in which there were no imports; second, a minimum guaranteed permanent basic quota not less than the actual importation for 1964. Imports of unprocessed shrimp in excess of quota will be subject to 50 percent ad valorem duty. All processed shrimp will pay a 25 percent ad valorem duty within quotas. Virtually all shrimp importations fall within the classification of "unprocessed" as defined in this bill.

South Carolina Memorial: To the House and the Senate on March 28 was presented a memorial of the Legislature of the State of South Carolina, memorializing the President and the Congress of the United States to enact suitable legislation to prohibit imports of shrimp from competing with our shrimp industry and to favorably consider H. R. 8982; referred to the Committee on Ways and Means.

STAMP FOR SPORT FISHING: H. R. 11410 (George P. Miller), introduced in the House on March 28, a bill to provide for the issuance of a Federal fishing stamp, to give the consent of Congress to a compact relating to the use of a Federal-State fishing stamp in connection with noncommercial fishing licenses for nonresidents of States, and for other purposes; to the Committee on Merchant Marine and Fisheries.

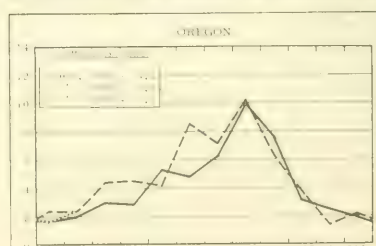
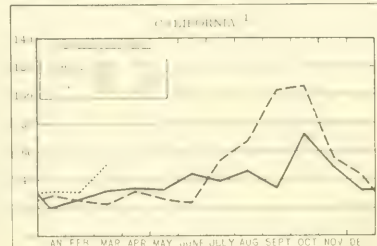
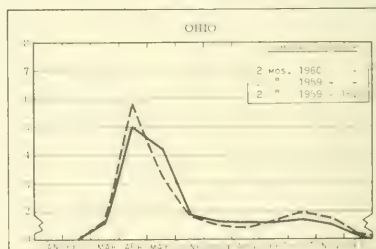
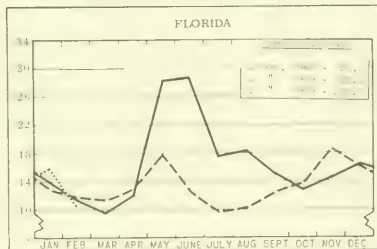
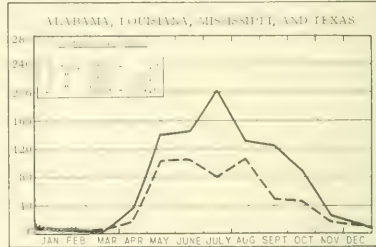
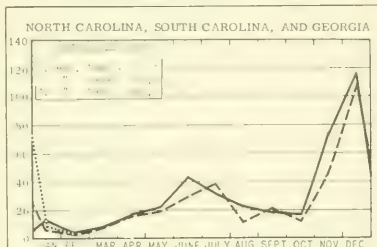
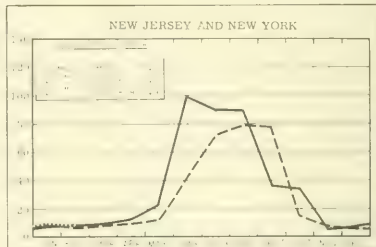
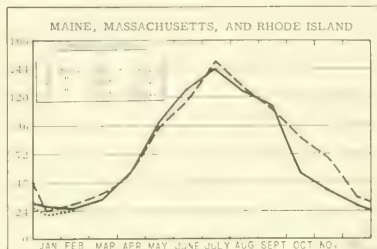
TARIFF NEGOTIATIONS: H. Con. Res. 618 (Cunningham), concurrent resolution expressing the sense of Congress that the United States should not grant further tariff reductions in the forthcoming tariff negotiations under the provisions of the Trade Agreements Extension Act of 1958, and for other purposes; to the Committee on Ways and Means; introduced in House March 11, 1960. Identical to several concurrent resolutions previously introduced.





CHART 1 - FISHERY LANDINGS for SELECTED STATES

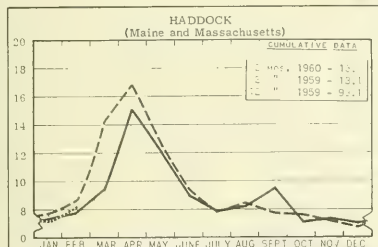
In Millions of Pounds



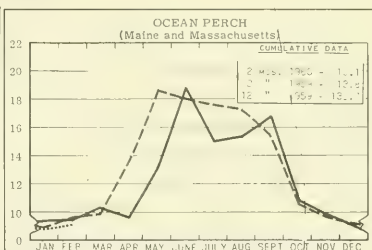
¹ ONLY PARTIAL--INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH
LANDING AT PRINCIPAL PORTS.

CHART 2 - LANDINGS for SELECTED FISHERIES

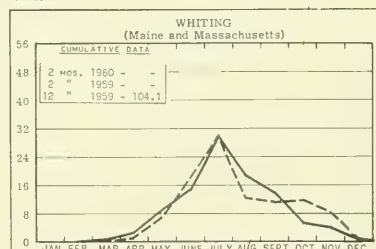
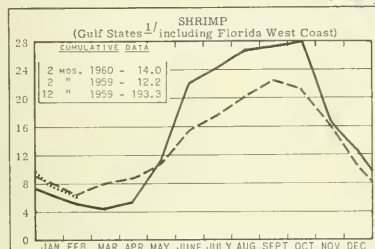
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LEGEND:
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1959/60
----- for
1958/59

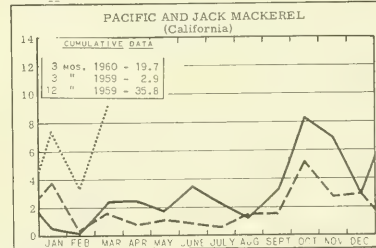
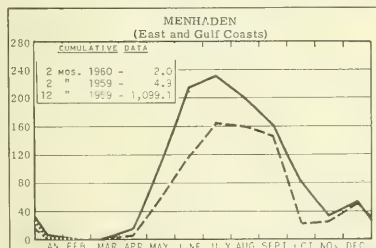


In Millions of Pounds



^{1/}ALA. & ALL. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

In Thousands of Tons



In Thousands of Tons

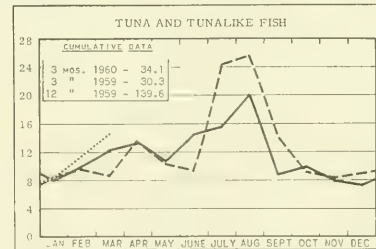
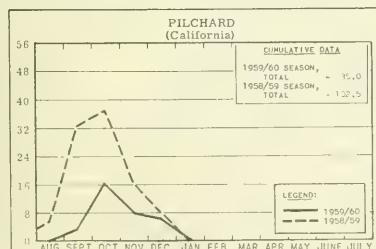
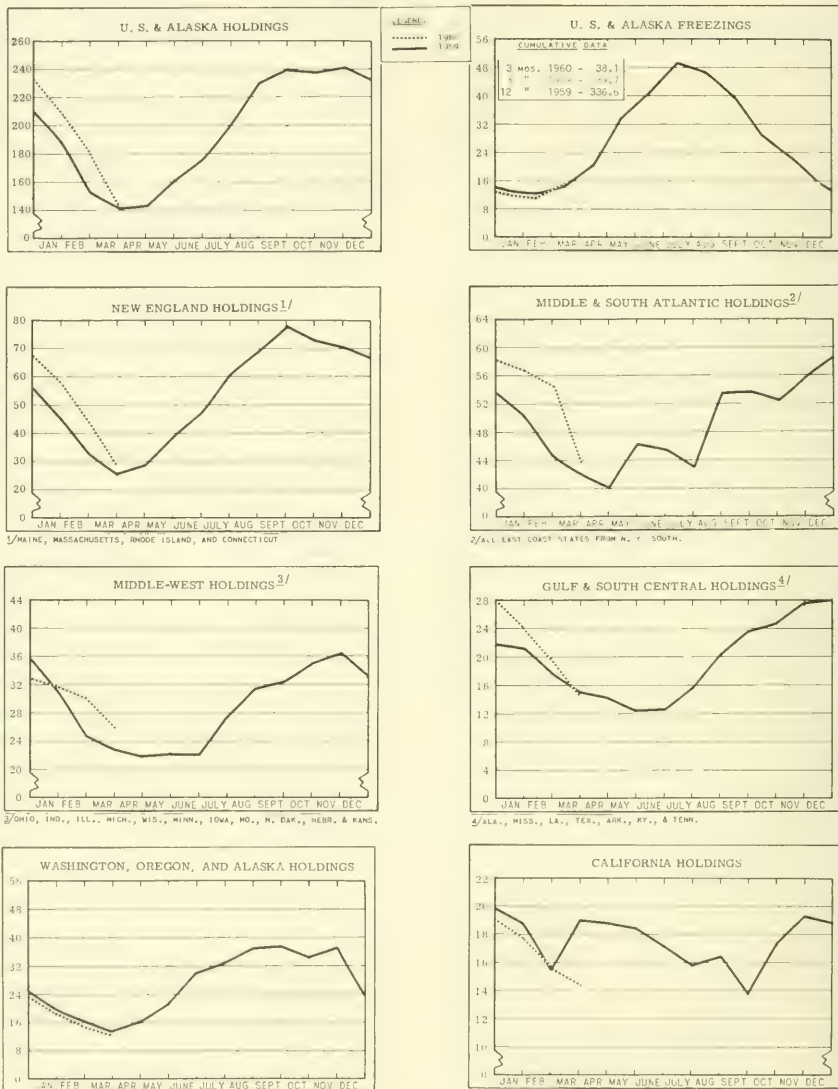


CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

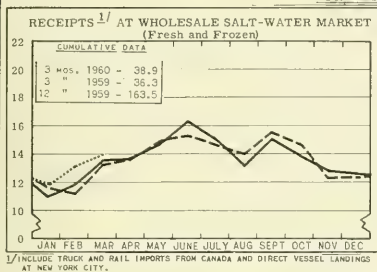
In Millions of Pounds



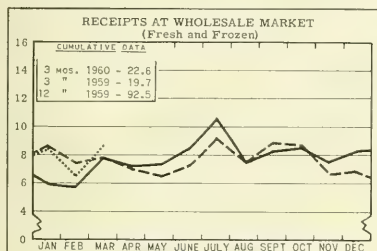
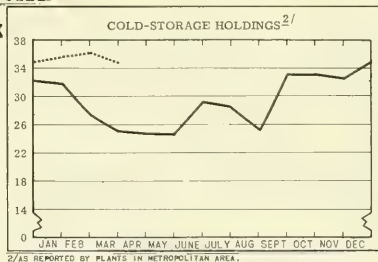
* Excludes salted, cured, and smoked products

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

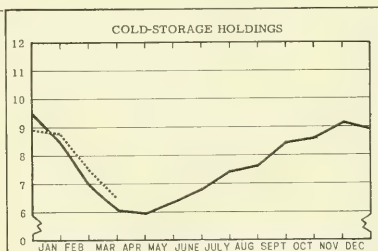
In Millions of Pounds



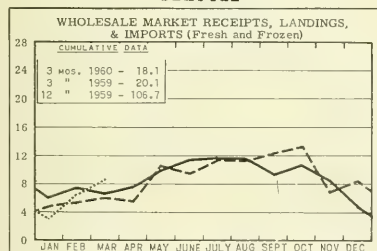
NEW YORK CITY



CHICAGO



SEATTLE



BOSTON

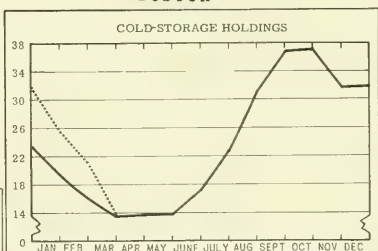


CHART 5 - FISH MEAL and OIL PRODUCTION - U.S. and ALASKA

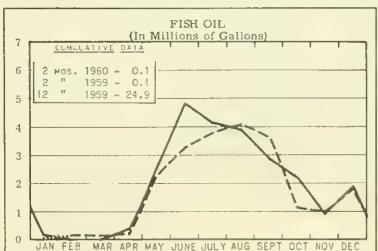
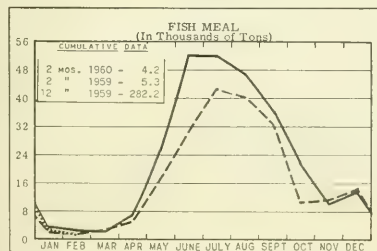
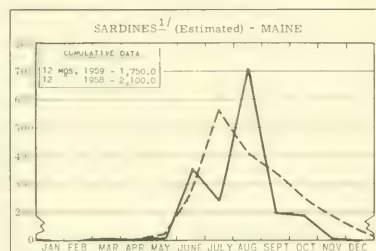
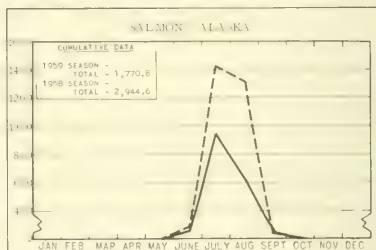
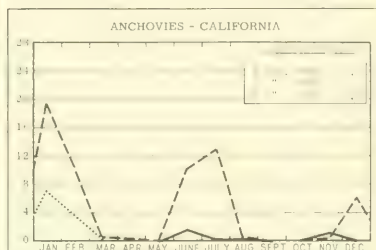
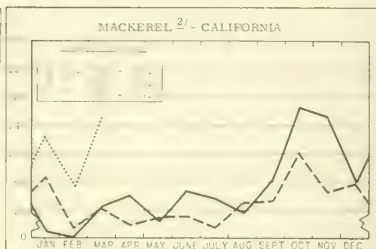
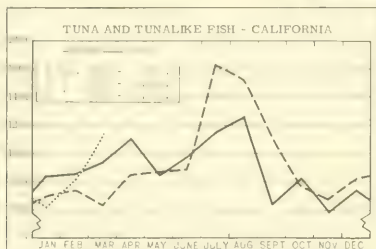


CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

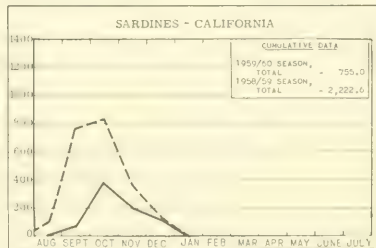
In Thousands of Standard Cases



¹/₁ INCLUDING SEA HERRING.

STANDARD CASES

Variety	No. Cans	Designation	Net Wgt.
SARDINES.....	100	$\frac{1}{2}$ drawn	3 $\frac{1}{2}$ oz.
SHRIMP.....	48	--	5 oz.
TUNA.....	48	# $\frac{1}{2}$ tuna	6 & 7 oz.
PILCHARDS...	48	# 1 oval	15 oz.
SALMON.....	48	1-lb. tall	16 oz.
ANCHOVIES...	48	$\frac{1}{2}$ -lb.	8 oz.



LEGEND: 1959/60
1958/59

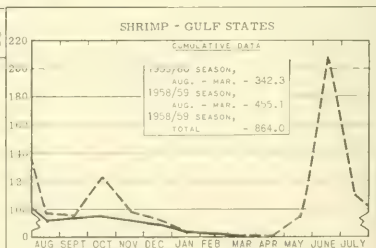
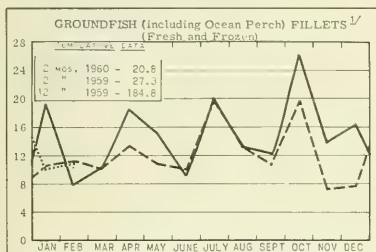
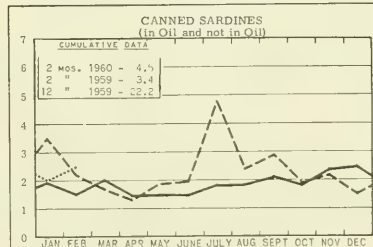
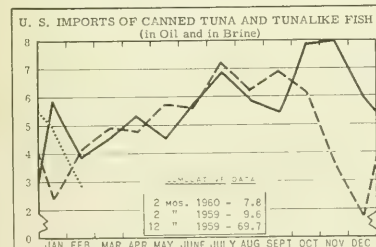
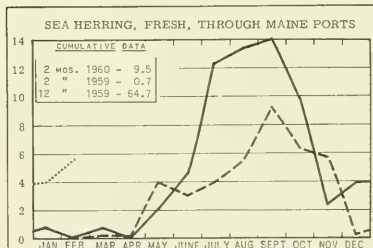
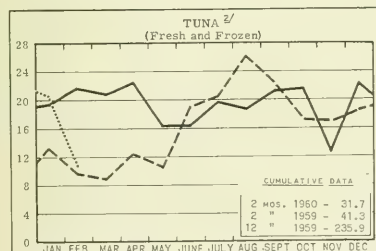
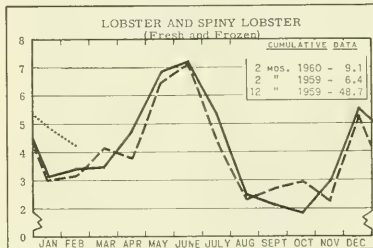
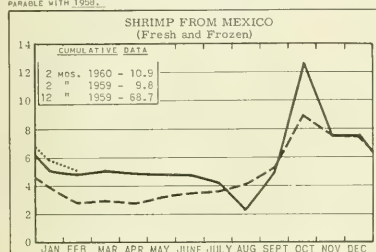
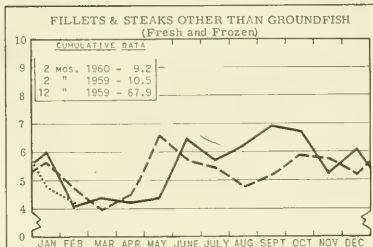


CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds

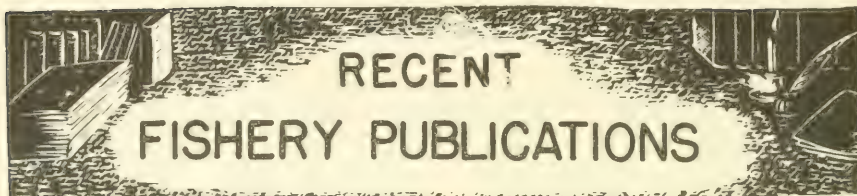


LEGEND:
..... 1960
———— 1959
- - - - 1958



^{2/} EXCLUDES LOINS AND DISCS.

^{1/} SINCE SEPTEMBER 15, 1959, FISH FILLET BLOCKS ARE CLASSIFIED UNDER A DIFFERENT CATEGORY THAN FILLETS; THEREFORE, 1959 DATA ARE NO LONGER COMPARABLE WITH 1958.



RECENT FISHERY PUBLICATIONS

FISH AND WILDLIFE SERVICE PUBLICATIONS

THE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

- CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
SL - BRANCH OF STATISTICS LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
SSR - FISH, SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

- | Number | Title |
|----------|--|
| CFS-2191 | - Massachusetts Landings, October 1959, 5 pp. |
| CFS-2194 | - Shrimp Landings, September 1959, 6 pp. |
| CFS-2195 | - Louisiana Landings, July, August, and September 1959, 4 pp. |
| CFS-2212 | - Fish Meal and Oil, December 1959, 2 pp. |
| CFS-2220 | - Frozen Fish Report, 1959 Annual Summary, 14 pp. |
| CFS-2222 | - South Carolina Landings, December 1959, 2 pp. |
| CFS-2223 | - Florida Landings, December 1959, 6 pp. |
| CFS-2225 | - Maine Landings, December 1959, 3 pp. |
| CFS-2226 | - Ohio Landings, December 1959, 2 pp. |
| CFS-2227 | - Rhode Island Landings, December 1959, 3 pp. |
| CFS-2228 | - Frozen Fish Report, January 1960, 8 pp. |
| CFS-2229 | - Alabama Landings, October 1959, 2 pp. |
| CFS-2232 | - Shrimp Landings, October 1959, 6 pp. |
| CFS-2234 | - Massachusetts Landings, November 1959, 5 pp. |
| CFS-2235 | - Texas Landings, December 1959, 3 pp. |
| CFS-2236 | - Georgia Landings, December 1959, 2 pp. |
| CFS-2237 | - New Jersey Landings, 1959 Annual Summary, 6 pp. |
| CFS-2238 | - New York Landings, 1959 Annual Summary, 8 pp. |
| CFS-2239 | - Mississippi Landings, November 1959, 2 pp. |
| CFS-2241 | - Virginia Landings, January 1960, 2 pp. The first in a series of monthly bulletins which will contain the catch and value of fish and shellfish landed in Virginia. |
| CFS-2242 | - Maryland Landings, January 1960, 2 pp. The first in a series of bulletins to be published monthly which will show the total Maryland catch and landed values by species for the major water areas. |

- CFS-2244 - California Landings, October 1959, 4 pp.
CFS-2249 - South Carolina Landings, January 1960, 2 pp.
CFS-2252 - North Carolina Landings, January 1960, 3 pp.
CFS-2254 - Alabama Landings, November 1959, 2 pp.
CFS-2255 - Shrimp Landings, November 1959, 6 pp.
CFS-2261 - Alabama Landings, December 1959, 2 pp.
CFS-2262 - New Jersey Landings, January 1960, 3 pp.
CFS-2264 - Florida Landings, January 1960, 6 pp.
CFS-2265 - Maine Landings, January 1960, 3 pp.
CFS-2266 - Georgia Landings, January 1960, 2 pp.

Wholesale Dealers in Fishery Products (Revised):
SL-20 - Texas (Coastal Area), 1959.
SL-21 - California, 1959.

- SSR-Fish. No. 290 - Water Quality Study of Wenatchee and Middle Columbia Rivers Before Dam Construction, by Robert O. Sylvester, 125 pp., illus., March 1959.
SSR-Fish. No. 314 - Sources of Hydrographic and Meteorological Data on the Great Lakes, by Charles F. Powers, David L. Jones, and John C. Ayers, 187 pp., illus., July 1959.
SSR-Fish. No. 315 - Northeastern Pacific Albacore Survey. Part 2--Oceanographic and Meteorological Observations, by Richard J. Callaway and James W. McGary, 138 pp., illus., July 1959.
SSR-Fish. No. 318 - Oceanographic Observations, 1958, East Coast of the United States, by C. Godfrey Day, 126 pp., illus., November 1959.
Sep. No. 583 - Processing and Quality Studies of Shrimp Held in Refrigerated Sea Water and Ice: Part 2 - Comparison of Objective Methods for Quality Evaluation of Raw Shrimp.
Sep. No. 584 - Shrimp - Waste Meal: Effect of Storage Variables on Pigment Content.
Sep. No. 585 - New Technological Laboratory for Fisheries Research in Gloucester, Mass.
Sep. No. 586 - Research in Service Laboratories (April 1960): Contains these articles--"Composition of Rockfish," and "Irradiation Preservation of Pacific Cod Fillets."
"The Acoustical Behavior of Some Fishes in the Blimini Area," by James M. Moulton, The Biological

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

Bulletin, vol. 114, no. 3, 1958, pp. 357-374, printed. (U. S. Fish and Wildlife Service, The Marine Biological Laboratory, Woods Hole, Mass.)

"The Role of the Blood in the Transportation of Strontium 90-Yttrium⁹⁰ in Teleost Fish," by Howard Boroughs and Della F. Reid, article, The Biological Bulletin, vol. 115, no. 1, 1958, pp. 64-73, printed. (U. S. Fish and Wildlife Service, The Marine Biological Laboratory, Woods Hole, Mass.)

(Baltimore) Monthly Summary - Fishery Products, November and December 1959; 9 and 10 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 400 E. Lombard St., Baltimore 2, Md.) Receipts at Baltimore by species and by states and provinces for fresh- and salt-water fish and shellfish; total receipts by species and comparisons with previous years; and wholesale prices on the Baltimore market; for the months indicated.

California Fishery Products Monthly Summary, January 1960, 13 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) California cannery receipts of tuna and tunalike fish, mackerel, anchovies; and pack of canned tuna, mackerel, and anchovies. Market fish receipts at San Pedro, Santa Monica, and Eureka areas; California imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; American Tuna Boat Association auction sales; for the month indicated.

(Chicago) Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Market Prices, January 1960, 12 pp. (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces for fresh- and salt-water fish and shellfish; and wholesale prices for fresh and frozen fishery products; for the month indicated.

Gulf Monthly Landings, Production, and Shipments of Fishery Products, February 1960, 8 pp. (Market News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; sponge sales; and imports at Port Isabel and Brownsville, Tex.; for the month indicated.

Halibut and Troll Salmon Landings and Ex-Vessel Prices for Seattle, Alaska Ports, and British Columbia, 1958-1959, 34 pp. (Market News Service, U. S. Fish and Wildlife Service, Pier 42 So., Seattle 4, Wash.) Lists the landings of halibut and troll salmon at leading United States ports of the Pacific Coast, and halibut landings at leading British Columbia ports for 1959, with comparative data.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, February 1960, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 So. King St., Hampton, Va.) Fishery landings and production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern

Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.

New England Fisheries--Monthly Summary, January and February 1960, 22 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Reviews the principal New England fishery ports, and presents food fish landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, Provincetown, and Woods Hole), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and landings and ex-vessel prices for fares landed at the Boston Fish Pier and sold through the New England Fish Exchange; for the months indicated.

New York City's Wholesale Fishery Trade--Monthly Summary for December 1960, 21 pp. (Market News Service, 155 John St., New York 38, N. Y.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, imports entered at New York City, primary wholesaler prices for frozen products, and marketing trends; for the month indicated.

(Seattle) Washington, Oregon, and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, February 1960, 7 pp. (Market News Service, U. S. Fish and Wildlife Service, Pier 42 So., Seattle 4, Wash.) Includes landings and local receipts, with ex-vessel and wholesale prices in some instances, as reported by Seattle and Astoria (Ore.) wholesale dealers; also Northwest Pacific halibut landings; and Washington shrimp landings; for the month indicated.

The Size and Shape of Metamorphosing Larvae of Venus (MERCENARIA) Mercenaria Grown at Different Temperatures, by Victor L. Loosanoff, 11 pp., illus., printed. (Reprinted from Biological Bulletin, vol. 117, no. 2, October 1959, pp. 308-318.) Bureau of Commercial Fisheries, Biological Laboratory, Milford, Conn.

THE FOLLOWING MARKET NEWS LEAFLETS ARE AVAILABLE FROM THE BRANCH OF MARKET NEWS, BUREAU OF COMMERCIAL FISHERIES, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C.

Number	Title
MNL-12	- Peruvian Fisheries, 1959.
MNL-14	- United Kingdom's Fishing Industry, 1958-1959.
MNL-15	- Japanese Trawling Operations in the Bering Sea.

THE FOLLOWING ENGLISH TRANSLATION OF A FOREIGN LANGUAGE ARTICLE IS AVAILABLE ONLY FROM THE U. S. FISH AND WILDLIFE SERVICE, BUREAU OF COMMERCIAL FISHERIES, P. O. BOX 3830, HONOLULU, HAWAII.

Attempts at Estimating the Abundance of Fish Population from the Data of Tuna Long Line Fishery. II--A Few Considerations on the Size of

Stratum, by Akira Suda, 11 pp., processed. (Translated from Nankai Regional Fisheries Research Laboratory, Report no. 7, February 1958, pp. 127-148.)

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

1959 Annual Report of the Secretary of the Interior (For the Fiscal Year Ended June 30, 1959), 522 pp., illus., printed, \$3. U. S. Department of the Interior, Washington, D. C. The activities of the Department's bureaus and offices, including the United States Fish and Wildlife Service, are summarized in this report. Among others, the activities of the Bureau of Commercial Fisheries are described. Activities discussed in detail are utilization of the commercial fishery resources; research in fishery biology (shellfisheries, anadromous, inland, and marine fisheries); conservation of Alaska commercial fisheries; Columbia River fisheries program; and Pribilof Island Fur-Seal industry. A summary of the various activities of the Bureau of Sport Fisheries and Wildlife is also included.

Public Fish Culture in the United States, 1958 (A Statistical Summary), by William Hagen and Joseph O. O'Connor, Circular 58, 47 pp., illus., processed, 35 cents, October 1959. A report summarizing the statistical data gathered from the third survey of state fish cultural activities conducted by the U. S. Bureau of Sport Fisheries and Wildlife. The previous surveys were carried out in 1937 and 1949. Basic tool in the present study was a questionnaire sent to all 50 states, requesting data on various aspects of their hatchery facilities and operations, including even an estimate of the expected fish requirements in 1970. This report includes tables showing distribution of fish, by species, from state hatcheries; distribution from Bureau hatcheries, 1957; fish food purchased by the states and the Bureau, 1948 and 1958; hatchery and fishery research and management by the states and Bureau, 1948 and 1958; and other pertinent data. Includes also a number of excellent photos of hatcheries.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ALGAE:

"Complex Primitives: The Red Alga Group," by I. MacKenzie Lamb, article, Natural History, vol. 69, no. 3, March 1960, pp. 16-25, illus., printed, single copy 50 cents. The American Museum of Natural History, Central Park West at 79th St., New York 24, N. Y.

ALMANAC:

The American Ephemeris and Nautical Almanac for the Year 1961, 523 pp., printed, \$4. U. S.

Naval Observatory, Nautical Almanac Office, Washington, D. C. (For sale by Superintendent of Documents, Government Printing Office, Washington 25, D. C.)

ANCHOVY:

"The Food of the Larvae of the Northern Anchovy *Engraulis mordax*," by Leo Berner, Jr., article, Inter-American Tropical Tuna Commission Bulletin, vol. 4, no. 1, 1959, pp. 1-22, illus., printed in English and Spanish. Inter-American Tropical Tuna Commission, La Jolla, Calif.

"Identification of the Egg, Early Life History and Spawning Areas of the Anchoveta, *Cetengraulis mysticetus* (Günther), in the Gulf of Panama," by John G. Simpson, article, Inter-American Tropical Tuna Commission Bulletin, vol. 3, no. 10, 1959, pp. 441-580, illus., printed in English and Spanish. Inter-American Tropical Tuna Commission, La Jolla, Calif.

ANGOLA:

V Congresso Nacional de Pesca, Angola 1958 - Resumos dos Trabalhos Apresentados (Fifth National Fishery Congress, Angola 1958 - Summaries of Papers Presented), 372 pp., processed in Portuguese. Gabinete de Estudos das Pescas, Lisbon, Portugal. Includes summaries of the 96 papers presented at the Fifth National Fishery Congress, Luanda, Angola, October 1958.

ARGENTINA:

La Pesca Marítima en el País (The Marine Fishery of the Country), by Armando Benjamin Sangiorgio, 47 pp., illus., printed in Spanish. Dirección General de Pesca, Secretario de Estado de Agricultura y Ganadería de la Nación, Buenos Aires, Argentina, 1959. A comprehensive report covering past accomplishments in the development of the fisheries; conservation of the living resources of the sea; distribution of marine life; and the continental shelf. It also discusses the present status of the fisheries; the high seas and coastal fisheries; marine algae; laws and enforcement; and world fishery production. Included are many statistical tables showing catch by areas and species, vessels by areas, and other pertinent data.

AUSTRALIA:

Australian Journal of Marine and Freshwater Research, vol. 10, no. 3, December 1959, 146 pp., illus., printed. Australian Journal of Marine and Freshwater Research, Commonwealth Scientific and Industrial Research Organization, 314 Albert St., East Melbourne, C2, Australia. Features, among others, articles on: "Some Aspects of the Ecology of Lake Macquarie, N.S.W., with Regard to an Alleged Depletion of Fish. VIII--Trends of the Commercial Fish Catch and Management of the Fishery;" "IX--The Fishes and Their Food;" "X--The Movement of Fish;" and "XI--Estimation of Fish Populations," by J. M. Thomson.

Fishing and Whaling, 1958-59, Statistical Bulletin no. 5, 20 pp., illus., processed. Commonwealth Bureau of Census and Statistics, Canberra, Australia. This is the fifth of a series of annual bulletins dealing with the fishing and whaling industries in Australia. The statistics, covering

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quantity and value of catch and related data, pertain to the year 1958/59 for fisheries and the 1959 season for whaling, with comparative data for the previous 4 years. The bulletin is divided into 4 parts. Part I deals with general fisheries including those for finfish, crustaceans, and molluscs. Part II includes fisheries for pearl-shell and trochus shell. Part III covers the operation of the whaling industry in Australia and Norfolk Island. Part IV shows particulars of overseas trade in fishery and whaling products.

A Review of the Victorian Fishing Industry, 87 pp., illus., processed. Fisheries and Game Dept., 605 Flinders St., Melbourne, C3, Australia. A concise and well-written report on the development and present status of the commercial fresh- and salt-water fisheries in the State of Victoria, Australia. Despite an extensive coastline, large stocks of fish are not readily available in Victorian waters. Since about 25 percent of the population of Australia inhabits this State which comprises only 3.3 percent of the land area, the demand on the fishery resources has been so great that importation of fish has been a necessity. Further development of deep-sea fisheries, such as that for yellow-eye mullet, Australian salmon, and tunas, and the fisheries in the inland lakes is suggested as a means of supplementing existing fish supplies. This report presents information on factors influencing or limiting Victorian fish production, expansion of the fisheries, imports, fishermen's cooperatives, canneries, sport fishing, and the functions of the Fisheries and Game Department.

BARNACLES:

The Settlement and Growth of BALANUS IMPROVISUS, B. EBURNEUS and B. AMPHITRITE, by H. B. Moore and A. C. Frue, 20 pp., illus., printed. (Reprinted from Bulletin of Marine Science of the Gulf and Caribbean, vol. 9, no. 4, pp. 421-440, December 1959.) The Marine Laboratory, University of Miami, Miami 49, Fla.

BEHAVIOR OF FISH:

"Izuchenie Povedeniya Ryb vo Vremya Lova" (A Study of the Behavior of Fish During Catching), by D. V. Radakov, article, Voprosy Ikhtologii, no. 6, 1956, pp. 37-46, printed in Russian. Voprosy Ikhtologii, Akademia Nauk, U. S. S. R., Ikhthologicheskaya Komissiya, Moscow, U. S. S. R.

"Rech' Ryb" (The "Language" of Fish), by Yu. A. Shemanskiy, article, Nauka i Zhizn, no. 8, 1958, p. 42, printed in Russian. Nauka i Zhizn, Prosveta, Novaya Ploschad', 4, Moscow K-12, U. S. S. R.

BROOK TROUT:

A Compendium of the Life History and Ecology of the Eastern Brook Trout SALVELINUS FONTINALIS (Mitchill), by Colton H. Bridges, Fisheries Bulletin No. 23, 30 pp., printed. Massachusetts Division of Fisheries and Game, 73 Tremont St., Boston 8, Mass., 1958.

CANADA:

Annual Report of the Fisheries Research Board of Canada, 1958/1959 (For the Fiscal Year Ended

March 31, 1959), 186 pp., illus., printed in English with additional introduction in French. A comprehensive summary of the work of the Fisheries Research Board of Canada and its field stations during 1958/1959. The work of the Board is organized in three closely coordinated fields: biological, technological, and oceanographic. During 1958 the Board's new 177-foot trawler-type research vessel, the A. T. Cameron, was placed in service on the Atlantic Coast; biological laboratory facilities in St. Andrews, New Brunswick, were increased; a new technological laboratory was nearly completed in Vancouver, British Columbia; a rented business block in London, Ontario, was modified to serve as laboratory headquarters for fresh-water fishery research; and expanded laboratory space was provided in the Great Slave Lake area. The report also covers activities at the Biological Stations, St. John's, Newfoundland, and Nanaimo, British Columbia; the Arctic Unit, Montreal, Quebec; and the Technological Stations at Halifax, Nova Scotia, Grande-Riviera, Quebec, St. John's, Newfoundland, London, Ontario, and Vancouver, British Columbia. A list of the publications and reports published during the year by the Board is included.

Journal of the Fisheries Research Board of Canada, vol. 16, no. 6, December 1959, 189 pp., illus., printed. Queen's Printer and Controller of Stationery, Ottawa, Canada. Includes, among others, these articles: "Keeping Quality of Pacific Coast Dogfish," by R. H. Moyer and others; "Marine and Freshwater Fishes of the Miramichi River and Estuary, New Brunswick," by R. A. McKenzie; "Survival and Production of Pink and Chum Salmon in a Coastal Stream," by J. G. Hunter; "Additional Observations Concerning Residual Sockeye and Kokanee (*Oncorhynchus nerka*)," by W. E. Ricker; and "Some Morphological Differences Between the Subspecies of Cutthroat Trout, *Salmo clarkii clarkii* and *Salmo clarkii lewisii*, in British Columbia," by S. U. Qadri.

Journal of the Fisheries Research Board of Canada, vol. 17, no. 1, January 1960, 126 pp., illus., printed. Queen's Printer and Controller of Stationery, Ottawa, Canada. Contains, among others, these articles: "The Effect of Time and Temperature of Cooking on the Palatability and Cooking Losses of Frozen Atlantic Codfish Fillets," by Iva L. Armstrong and others; "Incidence and Distribution of Infestation by *Sphyrurus lumps* (Krøyer) on the Redfish, *Sebastes marinus* (L.) of the Western North Atlantic," by Wilfred Templeman and H. J. Squires; "Estimating Abundance from Longline Catches," by Garth I. Murphy; "The Growth, Length-Weight Relationship, and Maturity of Haddock (*Melanogrammus aeglefinus* L.) from the Region of Lockeport, N.S.," by A. C. Kohler; "Biochemical Studies on Sockeye Salmon During Spawning Migration. IX--Fat, Protein and Water in the Major Internal Organs and Cholesterol in the Liver and Gonads of the Standard Fish," by D. R. Idler and I. Bitners; and "Biochemical Studies on Sockeye Salmon During Spawning Migration. X--Glucose, Total Protein, Non-Protein Nitrogen and Amino Acid Nitrogen in Plasma," by R. E. E. Jonas and R. A. MacLeod.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

CATFISH:

"Propagation of Channel Catfish (*Ictalurus lacustris*) at State Fish Hatchery," by Bruce Crawford, paper, Proceedings of the Eleventh Annual Conference, Southeastern Association of Game and Fish Commissioners, October 20-23, 1957, pp. 132-141, printed. Southeastern Association of Game and Fish Commissioners, Columbia, S. C., 1958.

COD:

"La Flotte Morutière Portugaise Devra Ralentir son Expansion Après 1964" (The Portuguese Codfishing Fleet Must Slow Down its Expansion Before 1964), article, La Pêche Maritime, vol. 39, no. 983, February 1960, pp. 73-74, illus., printed in French. La Pêche Maritime, 190 Boulevard Haussmann, Paris (8^e), France.

COMMISSIONS:

(Atlantic States Marine Fisheries Commission) Eighteenth Annual Report (to the Congress of the United States and to the Governors and Legislators of the Fifteen Compacting States), 54 pp., printed. Atlantic States Marine Fisheries Commission, 22 W. First St., Mount Vernon, N. Y., February 1960. Summarizes briefly the many activities of the Atlantic States Marine Fisheries Commission during 1959. Includes condensed reports of the work of the Commission and of the basic committees—legal, technological, biological, and executive. Discusses a report entitled "Recommendations by the Bureau of Commercial Fisheries as to What is Needed in Each State to Establish an Effective System of Catch Statistics," submitted in answer to a formal request made at the 17th Annual Meeting of the Commission. Also contains reports from the North Atlantic Section on the oyster crisis in Long Island Sound, the shad project, and clam investigations. The Middle Atlantic Section reports on dams and barriers on the Delaware River, marshlands protection, and decline of the croaker and sea trout fishery. The Chesapeake Bay Section discusses oyster mortalities, the Potomac Compact between Maryland and Virginia, fisheries of the Atlantic Bight, shad and blue crab projects, cooperative striped bass project, and Baltimore Harbor pollution problem. The South Atlantic Section reports on South Carolina's requirements concerning out-of-state licenses, disposition of marshlands, shad and blue crab projects, exploratory fishing for scallops and shrimp, and legislation for limitation of shrimp imports. Appendices include State legislation recommended, proposed inclusion of mollusks in the terms of the International Convention for the Northwest Atlantic Fisheries, and resolutions adopted by the Commission.

(Atlantic States Marine Fisheries Commission) Minutes of the 18th Annual Meeting (September 22-24, 1959, New York, N. Y.) 219 pp., processed, limited distribution. Atlantic States Marine Fisheries Commission, 22 W. First St., Mount Vernon, N. Y. Covers the minutes of the 18th Annual Meeting of the Commission with details of attendance; the first, second, and third general sessions; and section meetings of the

North Atlantic, Middle Atlantic, Chesapeake Bay, and South Atlantic Sections. Also includes accounts of the individual section meetings, resolutions recommended for adoption, and the executive committee meeting. Appendices include, among others, reports on research work accomplished by the Commission and its sponsoring agency, the U. S. Fish and Wildlife Service. Also included in the appendices are recommendations by the Bureau of Commercial Fisheries as to what is needed in each State to establish an effective system of catch statistics; and reports on increased consumption of fishery products through quality improvement; use made of Payne Act funds for fishery education and extent of State participation; disposal of radioactive wastes in the sea; and new approach in relations between angler groups and commercial fishery groups.

Gulf States Marine Fisheries Commission Tenth Annual Report 1958-1959 (to the Congress of the United States and to the Governors and Legislators of Alabama, Florida, Louisiana, Mississippi, and Texas), 38 pp., printed, for limited distribution. Gulf States Marine Fisheries Commission, 312 Audubon Bldg., New Orleans 16, La., February 1960. Outlines the Commission's activities for the period October 1958-October 1959, with a summary of some of the points of general interest in the Compact among the 5 Gulf States. Describes briefly the activities of each of those States during the period. Short discussions of the U. S. Fish and Wildlife Service activities in technological and biological research, exploratory fishing in the Gulf area, the Gulf fishery statistical and Market News program, and other activities are included. Also contains a financial report of the Commission.

CRABS:

The Shallow-Water Hermit Crabs of Florida, by Anthony J. Provenzano, Jr., 71 pp., illus., printed. (Reprinted from Bulletin of Marine Science of the Gulf and Caribbean, vol. 9, no. 4, December 1959, pp. 349-420.) The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

DENMARK:

"La Industria Danesa de Congelacion de Filetes de Pescado" (The Danish Fish Fillet Freezing Industry), by Henning Pedersen, article, Industrias Pesqueras, vol. 33, no. 784, December 15, 1959, pp. 427-428, printed in Spanish. Industrias Pesqueras, Policarpo Sanz, 21-2^o, Vigo, Spain. A translation of an article appearing in Danish Foreign Office Journal. Describes the enormous increase in the export of fish fillets from Denmark since World War II and a major factor in this increase, the development of freezing on a commercially-profitable basis. The advantages to the consumer of frozen fish fillets are discussed. The Danish industry utilizes two techniques for this process: the machine method, usually used for "round" fish, especially cod; and the hand-cutting method, used for preparing groundfish fillets. Mentions research in new techniques and the development of the Greenland fisheries. Greenland exports large quanti-

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ties of fillets to the United States. Between 1954 and 1958, the quantity and value of Danish exports of fish fillets more than doubled.

EAST AFRICA:

Lake Victoria Fisheries Service, Annual Report, 1958/59, 32 pp., illus., printed. East African High Commission, Nairobi, Kenya, 1959. Reports on the general activities of the Lake Victoria Fisheries Service, including studies on motor fishing vessels, radio equipment, random-sample recording, improved fishing boats, deep-water fishing survey, fish meal, use of gill nets, introduction of tilapia into Lake Victoria, fish marking, legal enforcement, and survey of fishing activity. Also includes statistical summaries of annual catches by species in 1958 at recording stations in Uganda, Tanganyika, and Kenya, which are the three territories under the authority of the East African High Commission.

ECHO-SOUNDING:

Echo Sounding Experiments in the Barents Sea, by I. D. Richardson and others, Fishery Investigations, series II, vol. XXII, no. 9, 61 pp., illus., printed, £1 (about US\$2.80). York House, Kingsway, London WC2, England, 1959.

"Locating Fish With Echo Sounder (A Report on the White Line Recorder, the Operation of the Echo Sounder, and Interpretation of the Echo-grams)," by Ralph Eide, Norwegian Fishing News, vol. 6, no. 4, 1959, pp. 15, 17, 19, 21, 23, illus., printed. Norwegian Fishing News, Ltd., Bergen, Norway.

ECOLOGICAL:

Ekspérimental'naia Ekologíia Pítaníia Ryb (Experimental Ecology of Fish-Feeding), by Viktor Sergeevich Ivlev, 252 pp., illus., printed in Russian. Leningradskiy (Food Industry Publishing House), Moscow, U. S. S. R., 1955.

EUROPEAN COMMON MARKET:

"L'Economie des Pêches Françaises Après un An de Marché Commun" (The Economics of the French Fisheries after One Year of the Common Market), by J. Merot, article, La Pêche Maritime, vol. 38, no. 981, December 1959, pp. 755-762, illus., printed in French. La Pêche Maritime, 190 Boulevard Hausmann, Paris (8^e), France.

"Situation et Evolution de la Pêche Maritime Italienne dans le Cadre du Marché Commun" (The Status and Growth of the Italian Marine Fishery Within the Framework of the Common Market), by C. de Felip, article, La Pêche Maritime, vol. 38, no. 981, December 1959, pp. 776-779, illus., printed in French. La Pêche Maritime, 190 Boulevard Hausmann, Paris (8^e), France.

FISH-LIVER OILS:

"A Substance in Lingcod Liver Oil Which Prevents Hypercholesterolaemia in Cholesterol-Fed Chickens," by J. D. Wood and Jacob Bely, article, Nature, vol. 185, no. 4711, February 13, 1960, pp. 473-474, printed. Nature, St. Martin's Press, 175 Fifth Ave., New York 10, N. Y.

FISHERIES MANAGEMENT:

Biological and Economic Aspects of the Management of Commercial Marine Fisheries, by Milner B. Schaefer, 5 pp., illus., printed. (Reprinted from Transactions of the American Fisheries Society, vol. 88, 1959, pp. 100-104.) Inter-American Tropical Tuna Commission, La Jolla, Calif., 1959.

"Program of the Branch of Fishery Management Services," by Willis King, paper, Proceedings of the Eleventh Annual Conference, Southeastern Association of Game and Fish Commissioners, October 20-23, 1957, pp. 62-66, printed. Southeastern Association of Game and Fish Commissioners, Columbia, S. C., 1958. The legal authority and objectives for this new Branch of the Bureau of Sport Fisheries and Wildlife, U. S. Fish and Wildlife Service, are discussed. Management services on Federal lands, cooperation on State fishery programs, and plans for new activities are covered.

FISHERY RESEARCH:

"Some Uses of Punch Card Methods in the Tabulation and Analysis of Fishery Research Data," by Ben Leeper, Herbert Stern, Jr., and Victor M. Lambou, paper, Proceedings of the Eleventh Annual Conference, Southeastern Association of Game and Fish Commissioners, October 20-23, 1957, pp. 226-232, printed. Southeastern Association of Game and Fish Commissioners, Columbia, S. C., 1958.

FLORIDA:

An Ecological Study of the Fishes of the Tampa Bay Area, by Victor G. Springer and Kenneth D. Woodburn, Professional Papers Series no. 1, 109 pp., illus., printed. Florida State Board of Conservation, Marine Laboratory, St. Petersburg, Fla., January 1960.

FROZEN FISH:

"La Commercialisation et la Consommation du Poisson Congelé dans le Pays Membres de l'O. E. C. E." (The Marketing and Consumption of Frozen Fish in the Member Countries of the O. E. C. E.), article, La Pêche Maritime, vol. 38, no. 981, December 1959, pp. 792-803, illus., printed in French. La Pêche Maritime, 190 Boulevard Hausmann, Paris (8^e), France.

GENERAL:

Fish and Ships (This Was Fishing from the Columbia to Bristol Bay), by Ralph W. Andrews and A. K. Larssen, 250 pp. of photos with short text, printed, \$10.60. The Fishermen's News, Fishermen's Terminal, Seattle 99, Wash. A picture history of the old days of cod, halibut, and salmon in the Pacific Northwest. It covers Indian customs, gill-netting under sail, horse and beach seining, early salteries and canneries, whaling, and sealing.

GILL NETS:

"Comparative Efficiency of Differently Coloured Gill-Net in the North Sea Salmon Fishing," by Atushi Koike, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 24, no. 1, 1958, pp. 9-12, printed in Japanese with English

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

abstract. Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

HERRING:

The Extent of the 1959 Herring Spawning in British Columbia Coastal Waters, by D. N. Outram, Circular No. 56, 13 pp., illus., processed. Fisheries Research Board of Canada, Biological Station, Nanaimo B. C., Canada, November 1959. Reviews the annual success of herring spawning in the major British Columbia herring stocks. Since the amount of spawn deposited in any region is proportional to the number of spawners, the annual estimates of spawn deposition not only form a basis for a quantitative index of the size of the spawning stock but also provide an indication of the escapement from the fishery and hence of the carry-over to the next fishing season. The present report covers the results of the 1959 spawn census in 12 areas along the British Columbia coast. In spite of the second largest winter catch on record, the size of the 1959 spawning escapements showed an increase from the previous year in all but 3 sub-districts. This terminated a steady, downward trend apparent during the past 6 years in the total amount of spawn deposited.

"Nabyludeniya za Povedeniem Kaspyskikh Kilek" (Observations on the Behavior of the Caspian Sprat), by I. V. Nikonov, article, Voprosy Ikhtologii, no. 6, 1956, pp. 21-36, printed in Russian. Voprosy Ikhtologii, Akademia Nauk, U. S. S. R., Ikhtologicheskaya Komissiya, Moscow, U. S. S. R. In this investigation, the behavior of sprats was studied to perfect methods of catching them by the use of light.

"Smalsild- og Feltsildtokt Med G. O. Sars i Tiden 24. September til 29. Oktober 1959" (Small Herring and Fat Herring Investigations by Research Vessel G. O. Sars Between September 24 and October 29, 1959), by Olav Dragesund, article, Fiskets Gang, vol. 45, no. 52, December 24, 1959, pp. 694-699, illus., printed in Norwegian. Fiskets Gang, Postgato Nr. 691 81, Bergen, Norway.

IMPORTS:

Schedule A-Statistical Classification of Commodities Imported into the United States, January 1, 1960, Edition, 268 pp., printed, \$3.50 domestic and \$4.50 foreign. (The cost of the Schedule includes supplemental bulletins and pages to keep it up to date for at least a year from the time of issuance.) Foreign Trade Division, Bureau of the Census, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) This Schedule exhibits the statistical commodity classifications (including fishery products and related commodities) used in compiling the official United States import statistics. It shows the complete commodity description and commodity code number for each statistical classification used in the published reports and machine tabulations of United States imports. In addition, it shows the country, customs district, commodity subgroup, commodity group, economic class, and

flag of vessel classifications, as well as the units of quantities used in the compilation of the data.

IRRADIATION PRESERVATION:

"Cuts Food Radiation Costs," article, Food Engineering, vol. 32, no. 1, January 1960, pp. 78-80, illus., printed. Food Engineering, McGraw-Hill Publishing Co., Inc., 330 W. 42nd St., New York 36, N. Y. Capital investment can be halved and operating charges reduced 75 percent in processing foods by the use of a new radiation generator, the L-band linac (traveling-wave linear accelerator). "Shelf-life extension of seafood by low dose irradiation presents an opportunity to reverse the declining trend of the fresh fish market," according to the author. In this type of processing, "one L-band linac will handle 9,200 lbs. per hr. at 250,000 rad. Previously, two conventional S-band linacs would have been required to handle 7,500 lbs. per hr., at more than twice the capital cost."

JAPAN:

Bulletin of the Japanese Society of Scientific Fisheries, vol. 25, nos. 7-9, November 1959, 97 pp., illus., printed in Japanese with English summaries. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-Chome, Minato-ku, Tokyo, Japan. Contains, among others, these articles: "Implication of the Scale Ring. III--Improvement of Age-Determination for Fishes," by Hideaki Yasuda; "The Comparison of Sardine Purse Seine Fishery Between Ohara and Katagiri in Chiba Prefecture (Significance of Fishery Harbour Reflected in the Attainment of Sardine Purse Seine Fishery)," by Makoto Inoue; "The Distribution of Stress on the Fishing Net. I--On the Static Load," by Yasushi Kondo and Makoto Suzuki; "The Cooperation of Some Legalized Antiseptics in Their Preservative Application to Fish Cakes," by Megumu Goda and Yoshinobu Isa; "The Softening Spoilage of Fish Sausage. V--Effect of Sodium Pyrophosphate and Sorbic Acid on the Growth of Spore of Bacillus circulans," by Hitoshi Uchiyama and Kelshi Amano; "Bacteriological Studies on the Spoilage of Fish Sausage. I--Number of Bacteria Present in the Meat of Fish Sausage on the Market," by Mikio Akamatsu; "Bacteriological Studies on the Spoilage of Fish Sausage. II--Kinds of Bacteria Present in the Meat of Fish Sausage on the Market," by Mikio Akamatsu; "Bacteriological Studies on the Spoilage of Fish Sausage. III--Aerobic and Anaerobic Growth of Three Kinds of Bacillus Which are Isolated from Fish Sausage," by Mikio Akamatsu; and "The γ -Radiation Oil Deterioration of Marine Products and Its Prevention (Preliminary Work)," by Kenzo Toyama, Toshiyuki Hirano and Hiroshi Yamaga.

Bulletin of the Japanese Society of Scientific Fisheries, vol. 25, nos. 10-12, December 1959, 108 pp., illus., printed in Japanese with English abstracts. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-Chome, Minato-ku, Tokyo, Japan. Includes, among others, the following articles: "Preparation of a Coating Material by Chlorination of Fish Oil. VI--Influence of Hydroxy Groups

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and Peroxides in Fish Oil on Chlorination," by Kosaku Suzuki; "Amino Acid Composition of the Muscle Extracts of Aquatic Animals. II--The Amounts of Free Amino Acids in the Muscle of Shellfishes and Their Variation During Spoilage," by Keiji Ito; "Biochemical Studies on the Edible Seaweed, *Porphyra tenera*. I--Contents of Various Nitrogenous Components in the Frond as Affected by the Type of the Nitrogen Source," by Shiro Sato and others; and "Riboflavin Contents in the Liver of Fish," by Hideo Higashi, Shigeo Murayama, and Kikuko Tabei.

LIGHT FISHING:

"Reaksiya Ryb na Tsvet" (The Reaction of Fish to Light), by T. I. Privol'nev, article, *Voprosy Ikhtologii*, no. 6, 1956, pp. 3-20, printed in Russian. *Voprosy Ikhtologii*, Akademiya Nauk, U. S. S. R., Ikhtologicheskaya Komissiya, Moscow, U. S. S. R.

MARINE BIOLOGY:

Some Information of the Basic Studies on Marine Biology in Japan, by Denzaburo Miyadi, Contributions from the Seto Marine Biological Laboratory, No. 306, 7 pp., illus., printed. (Reprinted from Proceedings of the UNESCO Symposium on Physical Oceanography, 1955, pp. 197-203.) UNESCO, Paris and Japan Society for the Promotion of Science, Tokyo, Japan, 1957.

NETS:

"The Selectivity and Effectiveness of Certain Types of Commercial Nets in the T. V. A. Lakes of Alabama," by C. E. White, Jr., paper, Proceedings of the Eleventh Annual Conference, Southeastern Association of Game and Fish Commissioners, October 20-23, 1957, pp. 142-151, printed. Southeastern Association of Game and Fish Commissioners, Columbia, S. C., 1958.

NORTH PACIFIC FISHERIES COMMISSION:

(International North Pacific Fisheries Commission) Proceedings of the Sixth Annual Meeting, 1959 (Seattle, Wash., November 2-7, 1959), 152 pp., processed. International North Pacific Fisheries Commission, University of British Columbia, Vancouver 8, B. C., Canada, February 1960. Covers the agenda, list of participants, minutes of sessions, and committee reports for the sixth annual meeting of the Commission. The appendixes present, among others, subcommittee reports on distribution of sockeye, pink, and chum salmon; results of deep-sea salmon tagging; racial studies, statistics, and sampling; oceanographic studies; king crab research; and long-term research planning by the member countries--United States, Canada, and Japan.

NORTHWEST ATLANTIC FISHERIES COMMISSION:

Selected Reports of the Standing Committee on Research and Statistics (from the 1958 and 1956 Annual Meetings), 68 pp., illus., processed, limited distribution. (Reprints from serial numbers 570, 540, 553, and 413B.) International Commission for the Northwest Atlantic Fisheries, Halifax, N. S., Canada, 1958. Includes the complete report of the Committee on Research and Statistics at the 1958 and 1956 Annual Meet-

ings together with appendixes. Presents reports of ad hoc subcommittees on requirements for the ocean perch symposium; marking; research on the sea scallop fishery of Subarea 5; statistics; chafing gear; assessment of benefits of mesh regulation; plankton and hydrography; sampling of Eastern Subarea 4 cod stocks; and others. Also presents an outline of present research and long-range needs in the Convention Area in regard to cod, haddock, ocean perch, halibut, statistics, sampling and population dynamics, standardization of measurements, gear selection and mesh measuring, and special projects.

NORWAY:

Cooperation Among Fishermen in Norway, Fiskeridirektoratets Skrifter, vol. IV, no. 2, 71 pp., illus., printed. A/S John Griegs Boktrykkeri, Bergen, Norway, 1959. Contains the following articles which were the basis for working papers presented at the FAO-ILO Technical Meeting on Fishery Cooperatives at Naples, May 12-21, 1959: "Business Organization and Management of Fishery Cooperatives in Norway," by Arne Nordset; and "A General Survey of the Development of Cooperation Among Fishermen in Norway and Methods by Which the Government Has Assisted the Organization," by Aslak Aasbø.

"Lofotfiskets Lønnsomhet 1959" (The Value of the Lofoten Fisheries in 1959), by Georg Oppendal, article, *Fiskets Gang*, vol. 46, no. 1, January 7, 1960, pp. 6-16, illus., printed in Norwegian. Fiskets Gang, Postgiro Nr. 691 81, Bergen, Norway.

"Rapport om Tokt med Johan Hjørt til Barentshavet 19 September til 24 Oktober 1959" (Report on the Trip of the Johan Hjørt to Barentshavet, September 19 to October 24, 1959), by Lars Middtun, article, *Fiskets Gang*, vol. 45, no. 47, November 19, 1959, pp. 639-640, illus., printed in Norwegian. Fiskets Gang, Postgiro Nr. 691 81, Bergen, Norway.

"Stortralernes Flske i 1958" (Large Trawler Fishery in 1958), by Sverre Mollestad, article, *Fiskets Gang*, vol. 45, no. 48, November 26, 1959, pp. 650-656, illus., printed in Norwegian. Fiskets Gang, Postgiro Nr. 691 81, Bergen, Norway.

"Stortralernes Lønnsomhet 1958" (The Value of Large Trawlers during 1958), by A. Holm, article, *Fiskets Gang*, vol. 46, no. 2, January 14, 1960, pp. 24-30, illus., printed in Norwegian. Fiskets Gang, Postgiro Nr. 691 81, Bergen, Norway.

OCEANOGRAPHY:

Canadian Oceanographic Research in the North Pacific Ocean, by J. P. Tully and A. J. Doddmead, 30 pp., printed. Fisheries Research Board of Canada, Pacific Oceanographic Group, Nanaimo, B. C., Canada, 1957.

PERU:

"Peru Rides a Fish Boom," by W. J. Jenkins, article, *Foreign Trade*, vol. 113, no. 5, February 27, 1960, pp. 18-20, illus., printed. Queen's

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Printer, Government Printing Bureau, Ottawa, Canada, single copy 20 Canadian cents. Discusses the recent tremendous increase in the production of Peruvian fish meal and its consequences. Whaling and the bonito fishery are also sizable industries. "Borne along on the rich harvest of the Humboldt Current, Peru's fisheries still hold first place among the countries of Latin America. Expanding fleets require up-to-date equipment. . . .", explains the author.

PICKEREL:

A Compendium of the Life History and Ecology of the Chain Pickerel ESOX NIGER (LeSueur), by Kenneth Wich, Fisheries Bulletin No. 22, 23 pp., printed. Massachusetts Division of Fisheries and Game, 73 Tremont St., Boston 8, Mass., 1958.

POLLUTION:

"Sources and Control of Radioactive Water Pollutants," by E. C. Tsvoglou and W. W. Towne, article, Sewage and Industrial Wastes, vol. 29, no. 2, 1957, pp. 143-156, printed. Federation of Sewage and Industrial Wastes Association, 4435 Wisconsin Ave., NW., Washington 16, D. C.

POND FISHERIES:

"A Preliminary Report on the Comparative Testing of Some of the Newer Herbicides," by J. R. Snow, paper, Proceedings of the Eleventh Annual Conference, Southeastern Association of Game and Fish Commissioners, October 20-23, 1957, pp. 125-132, printed. Southeastern Association of Game and Fish Commissioners, Columbia, S. C., 1958.

PROCESSING:

"Enzyme Visceration and Scaling of Fish," by W. W. Meinke, article, Frosted Food Field, vol. 30, no. 2, February 1960, pp. 52, 66, illus., printed. Frosted Food Field, Inc., 321 Broadway, New York 7, N. Y. In this study, findings indicate the feasibility of producing a clean wholesome fish product for human consumption from fish by an enzymatic visceration and cleaning process. The enzyme for the process must have the ability to degrade or breakdown protein structure. Favorable economic return can be obtained from this operation only if the cleaned fish can bring a premium price. Different species of fish vary in the ease with which the viscera and scales can be removed by enzymatic preparations. In the present study, the golden croaker was used.

PROCESSING MACHINERY:

"Fish-Processing Machines For Factory-Trawlers and Factory-Ships" by I. A. Schenck, article, Norwegian Fishing News, vol. 6, no. 4, 1959, pp. 25, 27, 29, illus., printed. Norwegian Fishing News, Ltd., Bergen, Norway.

SALMON:

"Adult Returns of Pink Salmon from the 1954 Fraser River Planting," by W. Percy Wickett, article, Progress Reports of the Pacific Coast Stations, no. 111, 1958, pp. 18-19, printed. Fisheries Research Board of Canada, Pacific Fisheries Experimental Station, 6640 N. W. Marine Dr., Vancouver 8, B. C., Canada.

British Columbia Salmon Spawning Report - 1959, 14 pp., processed. Department of Fisheries, 1110 Georgia St., W., Vancouver, B. C., Canada, February 1960. Covers the developments associated with the 1959 salmon migration, seeding, and escapement in the various areas of British Columbia.

"Directing Young Salmon," article, Nature, vol. 182, no. 4629, 1958, pp. 162-163, printed. Nature, St. Martin's Press, Inc., 103 Park Ave., New York 17, N. Y.

"An International Tagging Test with Salmon (Salmo salar L.) Smolts," by A. Swain and P. E. Caradine, article, Nature, vol. 185, no. 4708, January 23, 1960, pp. 206-207, printed. Nature St. Martin's Press, Inc., 175 Fifth Ave., New York 10, N. Y.

"Neketorye Dannye o Morskikh Migratsiyakh Semgi" (Some Data on the Sea Migrations of Salmon), by V. V. Azbelev and I. I. Lagunov, article, Voprosy Ikhtologii, no. 6, 1956, pp. 113-120, printed in Russian. Voprosy Ikhtologii, Akademia Nauk, U. S. S. R., Ikhtologicheskaya Komissiya, Moscow, U. S. S. R.

SHRIMP:

"Bacterial Content of Commercially Frozen Breaded Shrimp," by Rouben Kachikian, Edward P. Larken, and Warren Litsky, article, Frosted Food Field, vol. 30, no. 2, February 1960, pp. 50-51, printed. Frosted Food Field, Inc., 321 Broadway, New York 7, N. Y. A survey of 144 samples of commercially-frozen breaded shrimp (24 brands) indicated a high variation in the number and types of bacteria present. In the authors' opinion, consideration should be given each operation from fishing boat to the local market in an attempt to reduce the bacterial counts of the final product.

"Nutritive Value of Frozen Shrimp Offers Potent Promotion Prong," article, Quick Frozen Foods, vol. 22, no. 7, February 1960, pp. 125-126, 128, printed. Quick Frozen Foods, E. W. Williams, Publications, Inc., 82 Wall St., New York 5, N. Y. A provocative article describing the results of research on the biochemical composition and value in human nutrition of fresh and frozen shrimp. U. S. Department of the Interior's surveys predict an outstanding increase in the demand for shrimp during the next 15 years. The high value of shrimp, nutrition-wise, coupled with its abundance should be incentives for its increased consumption on a nationwide basis. The promotion of increased use of shrimp in the United States might be an alternative solution to the so-called oversupply problem to imposition of quotas or import duties by the Congress. Bills which would force such restrictions are now under consideration.

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A number of promising areas were located, and subsequently at least two were fished commercially. During June 1959, several inlets on the west coast of Vancouver Island and the area off the entrance to Nootka Sound were resurveyed. In all, 21 tows with a small otter trawl were completed. Details of all tows are presented in this report, which includes tables and maps of the areas studied.

SIERRA LEONE:

Report on Fisheries, 1958, 16 pp., printed, 1s. 6d. (about 21 U. S. cents). Government Bookshop, Water Street, Freetown, Sierra Leone, 1959. Reviews the accomplishments of the Fisheries Development and Research Unit of Sierra Leone since 1945. Also covers the work of the Development and Research Sections during 1958. A Fisheries Officer and Master Fisherman were appointed and commenced work on a four-point program including the (1) introduction of small inshore motor trawlers; (2) introduction of improved techniques to the indigenous fishery--outboard motors for canoes, etc.; (3) economic survey of the fishery including statistics and marketing and transportation methods; and (4) investigation of invertebrate fisheries such as shrimp, crayfish, and oysters. A program of research covering fish tagging, gear studies, and exploratory fishing was also initiated.

SOUTH CAROLINA:

Annual Report, 1958-1959, Contribution No. 31, 10 pp., illus., printed. (Reprinted from Report of South Carolina Wildlife Resources Department, Fiscal Year July 1, 1958-June 30, 1959.) Bears Bluff Laboratories, Wadmalaw Island, S. C., January 1960. A detailed description of the activities of Bears Bluff Laboratories for the period under review, covering the study of oysters, shrimp, blue crabs, finfish, pond cultivation.

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TRADE LIST:

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Canneries--Morocco, 11 pp. (February 1960).

Lists the names of canneries and addresses and types of products handled. Includes fish and shellfish canneries.

TROUT:

Introduction of the Hybrid Between the Eastern Brook Trout and Lake Trout into the Great Lakes, by John Budd, 4 pp., illus., printed. (Reprinted from The Canadian Fish Culturist, no. 20, August 1957.) Department of Fisheries of Canada, Ottawa, Canada.

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5/31/63

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EXPLORATORY FISHING IN LAKE ERIE, SEPTEMBER 1958-NOVEMBER 1959

By Reidar F. Sand* and William G. Gordon**

SUMMARY

Exploratory fishing to determine the commercial availability of smelt (*Osmerus mordax*) in the United States waters of Lake Erie, was conducted by the U. S. Bureau of Commercial Fisheries during the fall months of 1958 and from April to November 1959. In the 1958 investigation, lampara-seine operations were carried out from small Lake Erie trap net-type vessels. The 1959 investigation was expanded to include the systematic trawl coverage of Lake Erie, and the M/V *Active*, a large trap net-type vessel was chartered and successfully converted for the trawling work. Excellent catches of smelt were made with standard 50-foot cotton two-seam balloon trawls. Experimental efforts with a midwater trawl were not productive.



Fig. 1 - Canadian pound-net vessel. The crew is preparing to lift the smelt net.

Smelt was the most abundant species taken during the exploratory operations, and this species comprised more than 97 percent of the total catches recorded. Many

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trawl drags in the summer and early fall of 1959 resulted in catches of more than 500 pounds per half-hour drag. The best trawl drag produced a catch of 5,000 pounds of smelt in one hour. Large and medium size smelt (10 to 20 per pound) dominated most trawl catches and comprised over 80 percent (by weight) of all catches made by the Active.

Localities where otter-trawl drags yielded promising smelt catches included the west-central portion of Lake Erie in the late spring and early summer, the central portion in mid-summer, and the east-central portion of the lake in late summer and early fall.

Little fishing time was lost during spring and summer explorations. The late fall work, however, was hampered by strong winds, heavy seas, and hazardous vessel ice formations which prevented complete coverage of seasonal smelt distribution in 1959.

BACKGROUND

The American smelt (*Osmerus mordax*) was first successfully planted in the upper Great Lakes in about 1912 (Van Oosten 1936). It was not until the early 1940's, however, that any commercial abundance was noted in Lake Erie. About 1941 the Canadian fishing industry recognized the commercial possibilities of the resource and commenced production during the spring spawning run. Pound nets were used at first and later trap nets (fig. 1). By 1957, studies made by the U. S. Bureau of Commercial Fisheries, using the Bureau-owned vessels Cisco and Musky, showed that smelt had become one of the most abundant species in Lake Erie.

The decline in abundance of more valuable commercial species forced a general interest in smelt and other nonutilized species; but lack of fishing, except in restricted areas, left broad gaps in the knowledge of seasonal distribution. This interest in smelt, arising from the economic distress on the part of the industry, prompted the Ohio Commercial Fishermen's Association and the State of Ohio to request the assistance of the Bureau in developing efficient methods of exploitation of the smelt resource.

OPERATIONAL PROGRAM AND CRUISE ITINERARY

A search of the available literature failed to show any published information on the seasonal distribution of smelt in Lake Erie other than observations made on spawning concentrations in Canadian waters of Lake Ontario. With the exception of limited trawling work, confined to biological sampling, in the Central and Eastern Basins of Lake Erie by the Bureau vessel Cisco in 1957 and 1958, and by U.S. state and Canadian provincial agencies, no inventory work had been carried out.

Because of the lack of information on the distribution of smelt or other fish stocks in those areas, a program was planned to give primary emphasis to the systematic exploratory coverage of United States waters of the lake on a seasonal basis and to determining the commercial availability of smelt to both seines and standard-type otter trawls. Provisions were made in scheduled cruises for demonstrations of seine and trawling gear to commercial fishermen, research personnel from state agencies, and representatives from conservation groups.

In September 1958, preliminary explorations got under way from Vermilion, Ohio, with the trap-net vessel Pat. A lampara seine was used during the surface-scouting and echo-sounding operations which continued through November. From April through November of 1959, the surface-scouting and echo-sounding operations were continued and the operational program was expanded to include systematic trawl coverage of Lake Erie between Monroe, Mich., and Buffalo, N. Y. (table 1).

Table 1 - Cruises Completed During Bureau of Commercial Fisheries 1958-59 Lake Erie Fisheries Exploration				
Cruise No.	Vessel	Dates	Area of Coverage	Depth Range (Fathoms)
1	Pat	10/2-10/14/58	Huron to Lorain, Ohio	2-12
2	Thelma	10/18-11/28/58	Vermilion, Ohio, to Erie, Pa.	2-13
1	Active	4/21-5/12/59	Monroe, Mich., to Sandusky, Ohio	2-6
2	Active	6/2-6/24/59	Sandusky to Cleveland, Ohio	2-13
3	Active	7/6-7/23/59	Cleveland to Conneaut, Ohio	2-13
4	Active	8/3-8/17/59	Conneaut, Ohio, to Buffalo, N. Y.	5-25
5	Active	8/27-9/6/59	Conneaut, Ohio, to Dunkirk, N. Y.	5-25
6	Active	9/22-10/8/59	Fairport, Ohio, to Erie, Pa.	5-13
7	Active	10/20-10/27/59	Fairport to Vermilion, Ohio	2-13
8	Active	11/9-11/23/59	Vermilion to Port Clinton, Ohio	2-12

VESSELS USED

Three vessels were used in portions of the 1958-59 lampara-seine and trawl operations: Pat; Thelma H.; and Active. All three vessels were actively engaged in the commercial trap-net fishery when obtained.



Fig. 2 - A typical Great Lakes trap-net vessel similar to the vessels Pat and Thelma H., used in lampara-seine exploratory operations.

M/V "PAT": The Pat was obtained by cooperative agreement with the owner and used in the first phases of lampara-seine work (September-mid-October 1958). This vessel, a conventional trap-net boat of steel construction, is 36 feet in length with an 11-foot beam (fig. 2). It is powered by a 90-hp. gasoline engine and was originally equipped with a standard net reel and single winch for use in the trap-net fishery. Few changes were required for the seine operations. The existing trap-net reel was used for hauling both seine wings simultaneously, but it proved to be too high for easy handling of the lampara and was modified by construction of shorter stanchions. In addition, a recording depth-sounder with a depth range of 150 feet was installed.

M/V "THELMA H.": The Thelma H., also of typical trap-net design, was chartered to continue operations through November 1958. The vessel, 38-feet long with



Fig. 3 - M/V Active, chartered 50-foot trap-net vessel converted for exploratory fishing in 1959.



Fig. 4 - Winch engine and deck-gear arrangement aboard the M/V Active.

a beam of 13.5 feet, is powered by a 225-hp. gasoline engine. Conventional gear for trap-net operations--consisting of the trap-net reel and single deck winch--proved adequate for handling the lampara seine. The depth-sounding equipment from the Pat was installed aboard the vessel for exploratory operations.

M/V "ACTIVE": Since the smaller trap-net vessels were not ideally suited to the exploratory operations, a larger vessel, the Diesel-powered Active (fig. 3) was obtained by charter and operated from April to November 1959. This vessel is of wood construction, 50-feet in length with a 14.5-foot beam and a draft of 4.5 feet. The main engine is rated at 95 hp. (continuous duty).

The vessel underwent considerable modification for use in seining and trawling. Limited accommodations were added for three men aft of the existing pilothouse. A two-drum trawl winch, which held 80 fathoms of 3/8-inch cable on each drum, was mounted aft of the quarters (fig. 4). A modified net reel was mounted amidships on the

starboard rail for hauling the lampara seine. Power for both winch and reel was supplied by a separate 20-hp. air-cooled engine. Pipe stern davits and outriggers from winch to bulwark were added and were equipped with 9- by 4-inch standard

towing blocks (fig. 5). A steel mast and boom and all conventional deck gear and rigging necessary for the fishing operations were installed. The *Active* was also equipped with radiotelephone, a shallow-water depth-recorder, and a second recorder with a range sufficient to permit sounding the deeper waters of Lake Erie (210 feet). A 2-kw., 115 volt, a. c. generator was also installed.

GEAR AND METHODS

LAMPARA SEINING: The lampara seine used during the 1958 operations was a Pacific coast-type bait seine, 60 fathoms long by 7 fathoms deep. The wings were constructed of 9-thread, 4-inch-mesh cotton twine and were 200 meshes deep. The bunt was made of 12-thread, 1½-inch mesh cotton attached to a ½-inch mesh woven nylon bag. The seine was modified, during the 1959 investigation, by the addition of 40 fathoms of twine to each wing and removal of 50 meshes in depth to permit use in shallower waters.



Fig. 5 - On the right, stern davit and towing block used aboard the M/V *Active*.

A standard steel trap-net reel, about 12 feet long, was used aboard the smaller trap-net vessels. For use aboard the *Active*, the reel length was shortened to 8 feet. The lampara was set over the stern with a skiff or drag-and-buoy attached to one wing, in the usual circular setting pattern, and closed with the vessel downwind. With the trap-net reel described, it was possible to "dry-up" the lampara in 12 to 15 minutes. Both wings were hauled simultaneously and stacked on deck. Using this method, it was possible to set the lampara again without restacking one wing.

TRAWLING: Gulf of Mexico-type two-seam balloon trawls, 50-feet along the headrope and of 2½-inch, 18-thread cotton mesh in wings and body, constituted the principal trawl gear used during the 1959 operations. Cod end mesh sizes varied from 1 to 2½ inches. Some trawls were modified by the addition of a 1-inch mesh second intermediate. Bracket doors used with the nets measured 2½ by 6 feet and weighed about 180 pounds each. Dandyline gear (similar to that used in Pacific Coast otter trawling), with 60-foot cable extensions from doors to the trawl, was used on all exploratory drags. Only minor variations were made to permit fishing for smelt with the trawl running slightly above the bottom. The gear was set and hauled directly over the stern of the vessel. The cod end was hauled to the stern with a lazyline as the net was retrieved, and the catch was hoisted aboard.

With the exception of its action on certain soft-bottom areas, this gear performed well in Lake Erie at depths from 2 to 25 fathoms. The ratio of towing warp to depth (scope) varied from 5:1 in shallow water to 3:1 in deep water. Dragging speeds averaged approximately 2.5 miles an hour, and drags were normally either 30 minutes or 1 hour long. Most trawl drags were made downwind or with the sea, owing to a lack of reserve horsepower on the *Active*.

Trials were also conducted with a 40-foot-square nylon midwater trawl. Mesh sizes and construction of this trawl were discussed previously (Sand 1959). The trials were not productive owing to scattering of fish at midwater levels during the period.

Continuous echo-sounding was carried on during cruising and fishing operations for fish finding and locating bottom obstacles. Observations were recorded on weather and sea conditions, water temperatures, and bottom conditions at all fishing stations.

AREA COVERED

A total of 86 trawl stations and 9 lampara stations were established during the 1958-59 exploratory operations. Over three-fourths of these stations were east of Sandusky, Ohio (fig. 6).

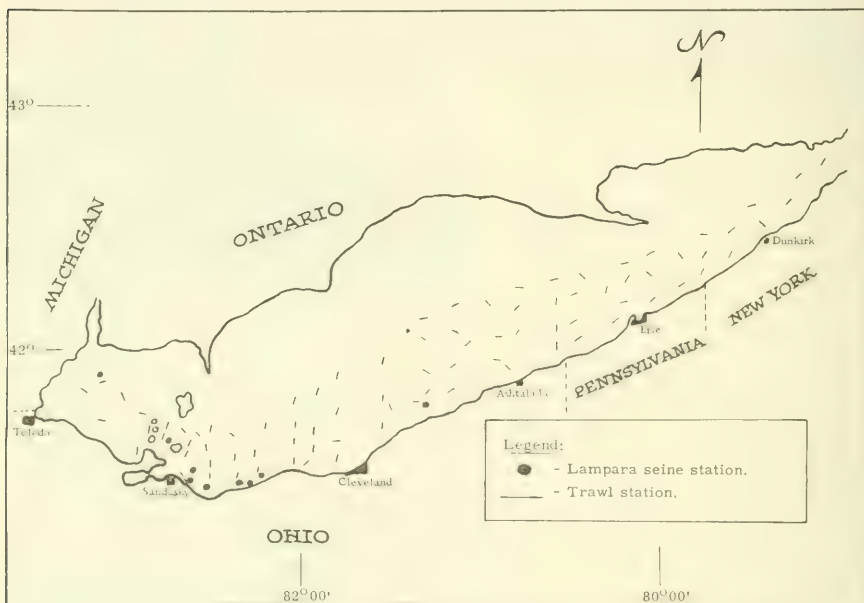


Fig. 6 - Locations of trawl and seine stations made by the vessels *Pat*, *Thelma H.*, and *Active*--1958-59.

The southwest-northeast axis of the lake amplifies the effects of strong winds in these directions. During the spring and fall seasons, winds of moderate-to-fresh velocities frequently cause dangerous seas in short periods of time. Good harbors, however, are usually within easy distance of fishing vessels working Lake Erie. Seiches (oscillations of water level of lake or landlocked sea) often produce currents in excess of 2 miles an hour at both the eastern and western ends of the lake. Neither these nor the observed variations in force and direction of winds, which caused surface currents for short periods, seriously hampered fishing operations.

The bottom configuration of Lake Erie between Monroe, Mich., and Buffalo, N. Y., shows great variation in form and composition. In Ohio waters, studies by

soil-erosion engineers have shown that over two-thirds of the bottom surface is mud. Hard clay, sand, mixtures of sand and mud, and outcroppings of rock make up the remainder. The bottom materials of the Pennsylvania and New York waters of the lake are also clay, sand, or mud and rock outcroppings.

For study, the United States waters of Lake Erie were subdivided into three zones on the basis of differences in depth and bottom configuration. These three zones are: The West Basin from Toledo to Sandusky, Ohio; the Central Basin from Sandusky, Ohio, eastward to Erie, Pa., and the East Basin from Erie, Pa., to Buffalo, N. Y.

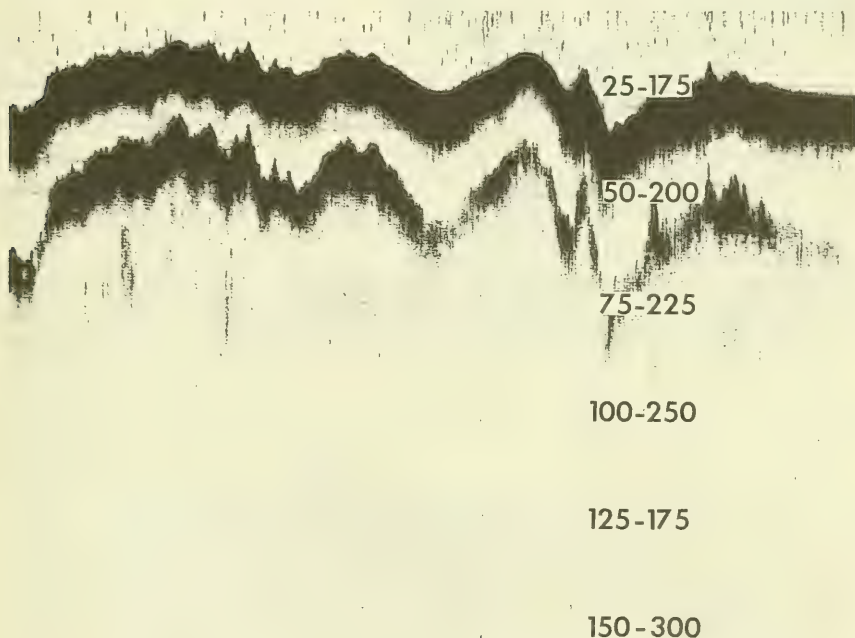


Fig. 7 - Depth recording made aboard the M/V *Active* in the vicinity of Port Clinton, Ohio. The typical irregular bottom of much of the inshore area of western Lake Erie is clearly shown.

WEST BASIN: This zone contains the island area extending westward from Sandusky to Toledo, Ohio. With a few exceptions, this zone is not well-suited to commercial-scale otter trawling. Limestone and dolomite bedrock crop out on the lake bottom in several areas. The largest areas of exposed rock occur near Marblehead, Ohio, and in all the interisland passages. Reefs composed of boulders and gravel are found off Locust Point and toward Port Clinton, Ohio (fig. 7). In addition to the generally poor trawling grounds there, the former pound-net fishery has left the bottom in some areas widely strewn with submerged net stakes. The intensive commercial trap-net fishery in this zone during the spring and fall seasons also further hinders trawling efforts. All drags in this zone, therefore, were of short duration. Western Lake Erie is also characterized by the almost total absence of thermal stratification. Normally, water temperatures in this zone are uniform over large

areas. Studies by Wright (1955) and work carried out by the Bureau's biological research vessel *Cisco* indicate that thermal stratification may be regarded as a minor factor in the aquatic environment of the West Basin.

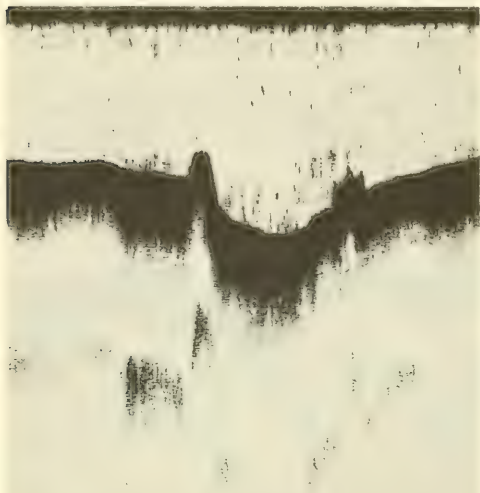


Fig. 8 - Depth recording of bottom northwest of Erie, Pa. Depth in 5-foot increments.

sive trawl damage was experienced in this area.

Knowledge of water temperatures in the deeper parts of Lake Erie is limited, but the fact that summer and early fall bottom temperatures are somewhat below those of the surface has been established. Thermal stratification occurs in central Lake Erie, often for prolonged periods, from late spring to early fall (fig. 9). Studies by the Bureau, the Ohio Division of Wildlife, and the Ontario Department of Lands and Forest indicate that oxygen depletions in the bottom waters occur prior to the close of thermal stratification. These oxygen depletions are attributed to natural causes and usually develop after prolonged periods of calm warm weather. The apparent effect on fish abundance and distribution is marked. Most trawl drags in the area during the period of oxygen depletion were water hauls.

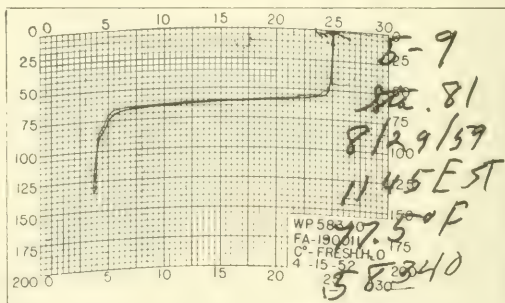


Fig. 9 - Bathythermograph tracing recorded in the East Basin of Lake Erie. Depth recorded in feet, temperature in degrees Centigrade.

EAST BASIN: The East Basin includes the deepest waters of the lake. The inshore waters, less than 8 fathoms in depth, are strewn with shale rock known locally as "shelf or slab rock." The width of this outcropping varies from a few hundred feet to several miles. The slopes are generally steep and these prevented

normal trawling operations. Beyond 8 fathoms, the slope becomes more gradual, and the bottom is composed of sand, clay, and mud providing good trawling grounds.

A well-defined thermal stratification (fig. 9) existed over much of the East Basin during cruises 4 through 6 of the *Active* (August 3-October 8, 1959). Vertical temperature differences, between surface and bottom, of 37° F. (40.0-77.0° F.) were recorded during cruises. Data collected by Parmenter (1929) and more recently by the M/V *Cisco* in this basin, indicate that wide temperature differences between surface and bottom water may occur annually.

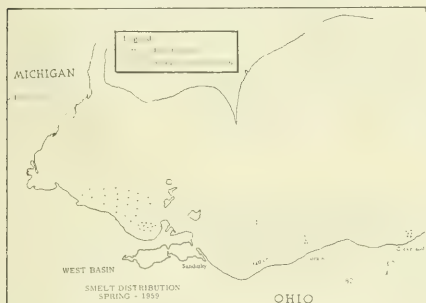


Fig. 10 - Chart of western Lake Erie depicting areas unsuitable for trawling and the spring distribution of smelt. Length of oblique lines is correlated with the area over which smelt were taken or observed.

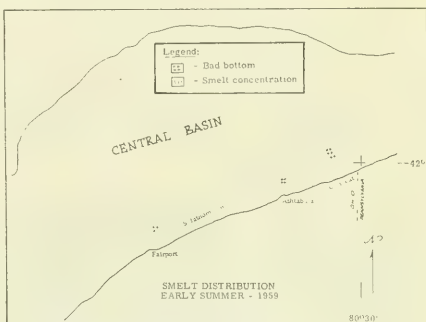


Fig. 11 - Chart of the fishing area showing early summer smelt distribution. Oblique lines designate areas where smelt were caught.

Exploratory operations were conducted along the entire south shore of Lake Erie and northward to the international boundary at depths greater than two fathoms. During the explorations, 253 trawl drags were made and 14 lampara-seine sets completed. Positions of seine sets and trawl stations are shown diagrammatically in figure 6. Areas of seasonal smelt concentration, and locations where snags, torn gear, or bad bottom were encountered, have been plotted on charts for reference (figs. 10, 11, and 12).

FISHING RESULTS

LAMPARA-SEINE FISHING: The exploratory operations by the vessels *Pat*, *Thelma H.*, and *Active* were not successful in producing commercial quantities of smelt with the lampara seine. Surface scouting, aerial surveys with light planes, and echo-sounding operations failed to reveal any large concentrations of smelt in surface waters.



Fig. 12 - Chart of the eastern half of Lake Erie showing areas where snags or bad bottom were encountered and areas where smelt concentrations were observed.

During the periods October 15-November 24, 1958, and April 21-November 23, 1959, a total of 14 seine sets produced only trace amounts of smelt, white bass (*Lepibema chrysops*), gizzard shad (*Dorosoma cepedianum*), alewife (*Pomolobus pseudo-harengus*), and emerald shiners a subspecies of *Notropis atherinoides*. As shown in figure 6, most of the seine trials were conducted west of Cleveland, Ohio, and close to shore. Prior to the start of exploratory work in 1958, observations by commercial fishermen and others indicated the possibility that smelt appear in

surface schools in inshore waters and near the Lake Erie islands. Hundreds of surface schools of fish were sighted during the 1958-59 work. Samples from some of these were identified as emerald shiners. A total of three lampara-seine sets made in 1959 on other schools resulted in small catches of white bass and minnows. To date, smelt have not been found to be available to capture in surface-seine operations in Lake Erie.

OTTER-TRAWL FISHING, WEST BASIN: Exploratory trawling operations in the shallow West Basin between Toledo and Sandusky, Ohio, were handicapped by boulder-strewn areas, rock outcrops, and the presence of numerous commercial trap-fishing nets. Individual trawl drags made near the islands showed some promise with catches of 10 to 50 pounds of yellow perch (*Perca flavescens*), catfish (*Ameiuridae*), carp (*Cyprinus carpio*), and sheepshead (*Aplodinotus grunniens*) per half-hour drag within the 4- to 5-fathom depth range. The small quantities of smelt taken in drags completed in this zone, however, gave little evidence of commercial concentrations during either the spring or fall months. Previous research has established that adult smelt are not abundant in this zone during the summer warm-water period.



Fig. 13 - 5,000 pounds of smelt taken in a one-hour drag by the M/V Active.

CENTRAL BASIN: From June 2 to November 23, 1959, 7 cruises were conducted in part in the Central Basin with 50-foot 2-seam semiballoon industrial-fish trawls at depths of 5 to 13 fathoms. With few exceptions, drags completed in summer months resulted in from 80 to 5,000 pounds of commercially-salable smelt per hour (fig. 13). Trawl catches in this zone during the fall months were lighter and failed to produce evidence of large smelt concentrations (table 2).

A summary of the trawling operations in the Central Basin shows a seasonal shifting of smelt concentrations and considerable variation in availability. In late spring

and early summer, catches of 20 to 600 pounds per hour were made between Sandusky and Ashtabula, Ohio. During the late summer, however, catches averaging

Table 2 - Fishing Log of M/V Active Otter Trawl Tows, 1959

Cruise No.	Dates	Geographic Area	Gear ^{1/}	No. of Tows	Time Towed (Avg.)	Fishing Depth (Range in Fathoms)	Smelt Catch (Lbs.)	Other Fish Catch (Lbs.)
1	4/21-5/13	West Basin	50' Trawl	14	00:25	2-6	85	369
2	6/2-6/24	Central Basin	50' Trawl	45	00:30	2-13	4,372	372
3	7/6-7/23	Central Basin	50' Trawl	66	00:45	6-13	5,275	224
4	8/3-8/17	Central & East Basin	50' Trawl	31	00:34	5-25	2,082	170
5	8/27-9/6	Central & East Basin	50' Trawl	29	00:34	5-25	4,325	89
6	9/22-10/8	Central Basin	50' Trawl	30	01:00	9-13	50,572	401
7	10/20-10/27	Central Basin	50' Trawl	14	00:29	5-13	95	94
8	11/9-11/23	Central & West Basin	50' Trawl	16	00:33	2-12	53	195

^{1/} Standard 50-foot two-seam Gulf of Mexico trawl fish trawl.

over 1,000 pounds per hour were made over much of the area extending from Ashtabula eastward to Erie, Pa., at depths of 10 to 13 fathoms.

Based on these successful fishing efforts, commercial-scale production trials were made on two occasions. In July, 7 days of fishing produced a total of 3,340 pounds of smelt (12 to 18 count). The second attempt, in late September, resulted in the capture of over 40,000 pounds of smelt (10 to 20 count) in 6 days of trawling (fig. 14). No severe gear damage occurred during either of the commercial scale demonstrations.

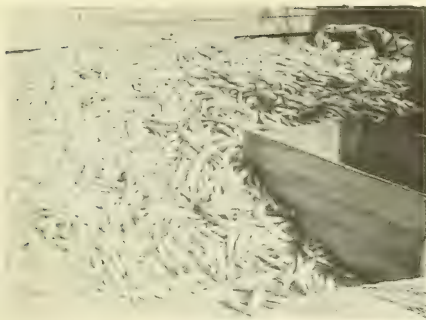


Fig. 14 - A good catch of marketable-size smelt aboard the M/V Active.

warm water, with the smaller individuals

generally inhabiting the shallow waters. At the start of each cruise, systematic echo-sounding transects were made to locate the best fishing areas and depths. Results indicated an intermittent distribution of smelt in the zone. Daily fluctuations in the catch rate were not fully understood, but diurnal vertical movement was determined to be one contributing factor (fig. 15).

Sample counts of smelt from the Central Basin ranged from 8 to 40 per pound. Data collected on the size distribution show that over 80 percent of the catches consisted of 10- to 20-count smelt. The difference in sizes was more marked, however, in the shallower depth range (shallower than 5-6 fathoms) in

EAST BASIN: The M/V Active also carried out limited exploratory trawling coverage of the East Basin during cruises 4 and 5 (August 3-September 6, 1959). The coverage accomplished, however, is not representative of the seasonal distribution of smelt or other fish stocks in this portion of the Lake.

Smelt catches here were light during the period August 5 to 11, 1959. Of the 14 trawl drags completed, 2 were water hauls; the remainder produced only 125 pounds of small smelt (20 to 40 count). Catch rates varied from 2 to 50 pounds per half-hour drag. On one occasion, the net and doors bogged down in the extremely soft bottom and only a portion of the catch was retrieved.

Commercially-salable smelt were taken in 12 drags in the East Basin in amounts of 20 to 500 pounds per half-hour drag August 28 to September 3. The best catch results were made on the slopes outside Dunkirk, N. Y., at depths of 10 to 12 fathoms, and off the Pennsylvania-New York border at depths of 15 fathoms. Catches up to 150 pounds per half hour were made along the 10-fathom contour. Deeper water catches were much lighter.

Several aspects of the smelt distribution pattern in the East Basin were notable. During the first cruise in this zone, few large smelt were taken, and the catch rate fluctuated widely with little regard to a particular depth range. Catches made during the second trip were more uniform, favored the larger individuals, and

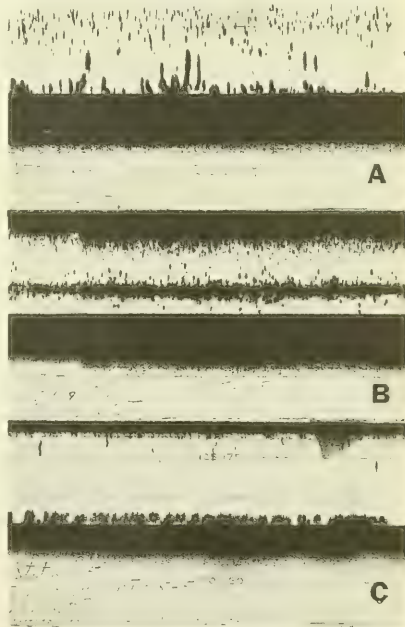


Fig. 15 - Depth recording made aboard the M/V Active off northeastern Ohio: (A) Typical tracings of fish concentrations made during daylight hours. (B) Tracings made during evening operations. (C) Tracings made 40 days later in same general area as A and B.

the smelt appeared concentrated within a narrower depth range. These differences may be attributed to a possible recruitment of smelt from the central basin following the reported oxygen depletion which existed there during late summer.

CONCLUSION

Results of the explorations from the 1958-59 work in Lake Erie indicate that the abundant smelt can be taken profitably on a commercial scale with trawling gear. There is evidence that the seasonal availability and distribution is closely related to lake water temperatures within a range of 41° F. to 68° F., and with the colder mid-50-degree range of temperatures preferred. The thermal stratification of water and vertical migration of the smelt will affect the availability to the fishing fleet. Day-light trawling for smelt appears much more promising than night fishing. Evidence to date suggests that when commercial-scale concentrations of smelt are found, they tend to be uniform in composition with few other species present.

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CHINOOK SALMON PREFER PLUNGING FLOW

The passage of individual chinook salmon was studied by the U. S. Bureau of Commercial Fisheries in a non-orifice pool-type "endless" fishway with a slope of 1:16 whereby fish were subjected to plunging and streaming flows on alternate circuits of the 16-pool unit. The effects of the two flows on rate of ascent were determined by comparing time required for each circuit of the fishway. Also on each circuit, individuals were observed as they passed through a specially constructed viewing pool.

Based on these data, a plunging flow appears to be the desired condition for all fish even though the majority performed equally well in either plunging or streaming flows.

During the tests, a series of view-pool observations plotted the movements of individual fish in terms of the time spent in each of four quadrants of the pool. When flows were plunging, the lower downstream quadrant was the dominant area utilized, while in streaming flows, the lower upstream quadrant was the favored area. During rest periods fish always aligned themselves to head into the current.



FISH FLOUR IS PRIMARILY A PROTEIN CONCENTRATE-- NOT A SUBSTITUTE FOR GRAIN FLOUR

"Can fish flour be used as a high protein flour in baking?" "Could fish flour be used as a replacement for flour in thickening gravies and soups?" "Would fish flour be more nourishing than whole wheat flours?" "Just how can fish flour be used in cooking?" "Is fish flour really a flour?" These kinds of questions are constantly being asked of the research staff of the U. S. Bureau of Commercial Fisheries' Technological Laboratory in College Park, Md., where research is currently being conducted on the nutritive value of fish flour.

First, let us consider the food that is commonly termed flour, or all-purpose flour, and its general functions in cooking. Flour is a milled product of wheat (although other flours may be produced from other cereal grains such as rice, barley, rye, or corn). All-purpose wheat flour is composed of 76.1 percent carbohydrate, primarily in the form of starch; 10.5 percent vegetable protein; 0.4 percent ash; 1.0 percent fat; and 12.0 percent water¹. The hydrative, adhesive, and gel-forming properties of the starch of flour account for the primary functions of flour in food preparation. Through these properties (1) soups and sauces may be thickened, (2) molded gels such as puddings may be formed, (3) the framework of such baked products as muffins, breads, biscuits, and cakes may be formed, and (4) other foods such as flaked fish may be cemented together to form croquettes, etc. The formation of the frame work of the more firm baked products, such as bread, is enhanced by the elastic and extensible properties of the vegetable protein glutenin, which comprises about 60 percent of the total protein of flour.

Now let us consider the properties of fish flour and how these might function in food preparation. In general, fish flour is a product prepared by defatting, drying, and milling by a variety of methods a whole fish, fish fillet, or fishery byproduct. It is white or tan in appearance, very powdery in consistency, usually odorless, and is either flavorless or possesses a nutty flavor. A mild odor and flavor of fish is obtained if small quantities of residual fat are retained in processing--a desirable characteristic for certain purposes. Fish flour is composed of 70-95 percent animal protein; 2-25 percent ash, mostly calcium and phosphorous; 3-12 percent water; and negligible quantities of carbohydrate and fat. The specific physical characteristics and chemical composition of any particular fish flour are a function of the raw material and the method of processing utilized. But, satisfactorily prepared, fish flour should contain all the quality protein, and important dietary minerals and vitamins contained in the fresh, raw fish. Fish flour would primarily be used as an animal protein and/or calcium and phosphorous supplement of processed foods to improve their nutritive value. Such processed foods might include breads, cookies, crackers, breakfast foods, cake and pancake mixes, macaroni products, baby foods, dietetic foods, and perhaps even flour itself--all-purpose flour, that is.

¹ Percentages obtained from Composition of Foods, USDA Agriculture Handbook No. 8, Miscellaneous Publication 572, June 1950.

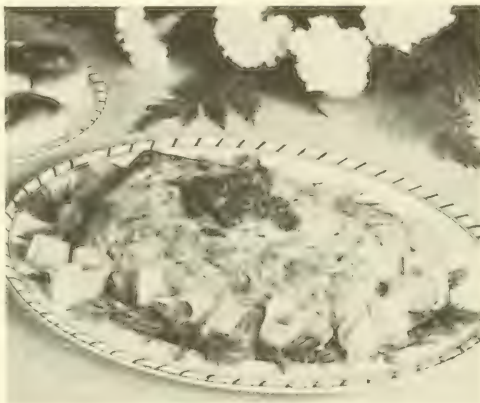
Fish flour might also be used as the meat base in dehydrated or prepared soups, sauces, and gravies.

So, fish flour does not contain any of the factors in common flour that give this latter product its specific properties in food preparation. Fish flour, instead, is primarily a potentially valuable animal protein concentrate with unique nutritional properties for use in food preparation. The term "flour" as applied to this fish protein is perhaps unfortunate and misleading, since fish flour is not really a flour at all.



HALIBUT

Halibut are principally harvested in the North Pacific waters off the coasts of Washington, British Columbia, and Alaska. Smaller amounts of halibut are taken off the North Atlantic coast.



Halibut is the largest of the flatfishes ranging in size commercially from 5 to 80 pounds. This large, firm, and flavorful fish is one of the most highly prized of all white-meated fish and may be prepared by any of the basic cooking methods such as frying, baking, broiling, boiling, and steaming.

Halibut is available the year around in all parts of the United States, mainly as frozen steaks. Steaks are the cross-section slices of dressed fish containing a cross section of the backbone. Chunks and fillets are other forms in which halibut may be purchased.

As a different way of serving halibut, the home economists of the U. S. Bureau of Commercial Fisheries recommend "Baked Halibut Loaf."

BAKED HALIBUT LOAF

1 pound halibut steaks or fillets	1 tablespoon chopped parsley
1 quart boiling water	$\frac{1}{2}$ cup coffee cream
1 tablespoon salt	1 teaspoon grated onion
1 chicken bouillon cube	1 teaspoon salt
$\frac{3}{4}$ cup boiling water	Dash pepper
$\frac{1}{2}$ cups soft bread cubes	2 teaspoons lemon juice
$\frac{1}{2}$ cup chopped celery	2 eggs, beaten

Place steaks in boiling salted water. Cover and return to the boiling point; simmer for 10 minutes or until fish flakes easily when tested with fork. Drain. Remove skin and bones. Flake. Dissolve bouillon cube in boiling water. Combine all ingredients. Place in a well-greased loaf pan, 9 x 5 x 3 inches. Bake in a moderate oven, 350° F., for 1 hour or until loaf is firm in the center. Serves 6.



TRENDS AND DEVELOPMENTS

Fishing Vessel and Gear Developments

EQUIPMENT NOTE NO. 4-- A METHOD OF MAKING ELECTRICAL TRAWL CABLE TERMINATIONS AND CONNECTIONS:

The use of a depth-sensing unit, electrical trawl cable, and a shipboard indicator to telemeter measurements of the operational depth of midwater trawls has been described previously (McNeely 1958, 1959). Correspondence subsequently received at the U. S. Bureau of Commercial Fisheries Seattle Exploratory Fishing and Gear Research Base indicates a growing interest by marine scientists in the use of

electrical cables which can tow fishing gear and sampling devices and transmit measurements of (1) performance characteristics, and (2) physical properties of the water masses through which the devices pass. Detailed descriptions of methods of making cable terminations and connections have been requested frequently.

This was prepared to answer these requests. It describes and illustrates workshop techniques and materials tested and found reasonably reliable as a result of use aboard the Bureau's exploratory fishing and gear research vessel *John N. Cobb*. The general procedure and materials shown can be used to make similar terminations and connections with cable types and marine instruments other than those indicated.

CABLE TERMINATION



Fig. 1 - Operation 1. Slip the socket section of the sensing-unit housing onto the cable to a position 10 to 12 inches from the cut end. Wind several turns of small-diameter tinned seizing wire around the cable to form a band approximately one-eighth inch wide, 7 inches from the same end. Twist the ends together, solder, and clip off excess wire at the twist. DO NOT ATTEMPT TO SOLDER THE BAND TO THE CABLE.



Fig. 2 - Operation 2. Clamp the cable upright in a vise and unwind the outer layer of steel strands--one by one. Bend the strands at the seizing band until each is perpendicular to the cable. Unwind the inner layer of steel strands--one by one--and bend each of these strands sufficiently to pass down between the outer strands.



Fig. 3 - Operation 3. Clip off the strands of both layers approximately seven-eighths of an inch from the sewing band. Using a pair of "needle-nose" pliers, bend a right-angle hook on each strand one-quarter inch from the end.



Fig. 5 - Operation 5. Wind successive layers of $\frac{1}{8}$ -inch fiberglass tape around the conductor section to a thickness of about one-eighth inch. Butt the edge of the tape firmly against the sealing compound. Build a second section of successive layers of tape to a thickness of one-sixteenth inch directly above the first. Wind any extra tape around the remaining unprotected conductor section and secure the end.



Fig. 4 - Operation 4. Roll out a small thread of sealing compound and tamp it in around the conductor section of the cable.



Fig. 6 - Operation 6. Move the socket on the cable until it rests firmly against the bent strands. Pack sealing compound around the cable at the bottom of the socket by tamping it with fingers or other blunt object. Figure 9 shows the sealing compound around the cable. Clamp the cable upright in a vise at a position which will allow the socket to be moved a short distance away from the bent ends of the cable strands. The bent ends should not protrude above the threaded edge of the socket. Wind several layers of glass tape around the threaded edge of the socket, allowing about three-sixteenths of an inch of the tape to form a rim above the edge of the socket.



Fig. 7 - Operation 7. Heat a sufficient amount of babbitt in a ladle until it becomes molten and will blacken a splinter of dry wood. Pour the molten babbitt into the socket in one continuous stream until it rises one-sixteenth to one-eighth of an inch above the threaded edge.



Fig. 9 - Operation 9. File the excess babbitt from around the edge, leaving a shoulder one-sixteenth of an inch wide. Do not remove the glass tape from the conductor section until this operation is complete.



Fig. 8 - Operation 8. This operation is one of the most important of the series. The molten babbitt must be cooled IMMEDIATELY. A pail of water containing a rag should be provided for this purpose. Place the wet rag around the socket until the surface of the babbitt appears to solidify. Remove the babbitted socket from the vise and plunge it into the water for further cooling. When cool, remove it from the water and pull the socket away. The babbitted section is shown in figure 9.



Fig. 10 - Operation 10. Remove the glass tape. Roll back and carefully cut off the nylon sheath covering the conductor section. Separate the conductors and the fillers. Cut away the fibrous fillers and the rubber center filler. Cleanse the conductors with a rag dampened in solvent.

SENSING UNIT CONNECTIONS



Fig. 11 a, b. - Operation 11. Designate one of the conductors (number 5) for temperature-sensing unit. Seal the conductors not used with self-vulcanizing rubber tape and coil them. If temperature-sensing thermistors (Fig. 11b, 11c) are to be used, cut the two appropriate leads of the temperature-sensing unit to the conductors. Insulate the soldered joints with self-vulcanizing rubber tape that has been cut into strips. When applying the self-vulcanizing tape, stretch it until it becomes quite thin and many rounds are required to cover the joint and adjacent areas.



Fig. 13 - Operation 13. Place a rubber "O" ring and a feed-through nut on each conductor. Lubricate "O" rings and nuts lightly with silicone grease. Start the nut on the conductor and turn it clockwise until the top thread is exposed. Start the nut and tighten it tightly while the top thread is exposed. Turn the nut counter-clockwise until the top thread is exposed and counter-clockwise pull on the conductor. This prevents severing the conductor by allowing it to work within its insulation. Turn the nut clockwise until the top thread is exposed. Tighten the nut. The nut should be snug at this point with optimum tension. Any further tightening may sever the wires without apparently damaging the rubber insulation.

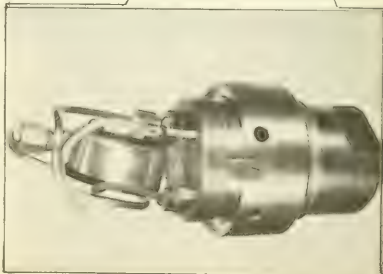


Fig. 14 - Operation 14. Apply a light film of silicone grease to the "O" ring and nut. Tighten the nut. Tighten the nut until the groove of the band screw on body is visible. Insert the key and secure screw. The instrument is now ready for use.



Fig. 12 - Operation 12. Insert necessary conductors into feed-through holes in the sensing unit housing. Place the thermistor unit inside the base in a manner that will allow the babbitted section to move forward without pinching or cutting the conductor. Grease the babbitted section of the conductor with silicone grease. Tighten the nut. DO NOT TURN THE BASE--as this will twist the conductors.



After the feed-through nuts are in place, solder a terminal to each conductor end and connect to the pressure potentiometer.

LITERATURE CITED

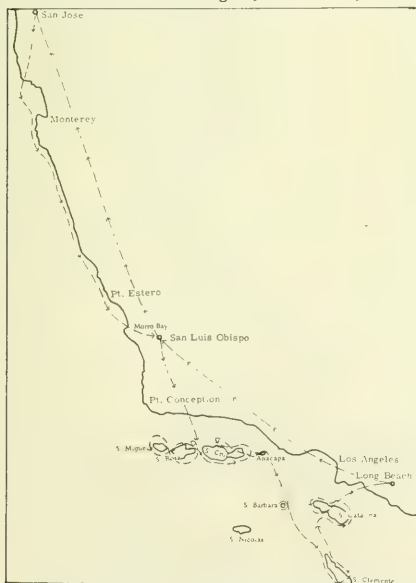
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California

AERIAL CENSUS OF COMMERCIAL ABALONE FISHING CONTINUED:

Airplane Spotting Flight 60-6-Abalone: The shoreline from Monterey to Morro Bay and the Channel Islands of San Miguel, Santa Rosa, Ana-



Airplane Spotting Flight 60-6 (March 16, 1960), to locate specific areas of commercial diving on opening day of abalone season.

capa, Santa Barbara, San Clemente, and Santa Catalina was surveyed from the air on March 16, 1960, by the California Department of Fish and Game Twin Beechcraft to locate specific areas of commercial diving on the opening day of the abalone season.

From Monterey south to Morro Bay the water was dirty and the ground swells were high. However, one boat was operating just north of Pt. Estero. Among the Channel Islands the weather was better, the swells were diminished and the water clearer. Two boats were observed operating at Santa Barbara Island.

Kelp apparently has maintained itself among the Channel Islands. Conditions appeared to be about the same as when observed on December 5, 1959. Along the mainland, north of Morro Bay, the kelp beds were still present although some showed signs of deterioration from the winter storms.

Note: Also see *Commercial Fisheries Review*, March 1960, p. 16.

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CRAB FISHING AREA AND INTENSITY STUDIES CONTINUED:

Airplane Spotting Flight 60-2-Crab: The commercial dungeness crab fishing areas from Monterey to the California-Oregon border were surveyed from the air on January 20-21, 1960, by the California Department of Fish and Game Cessna 182 to determine the fishing localities and the relative density of crab gear of the northern California crab fleet.

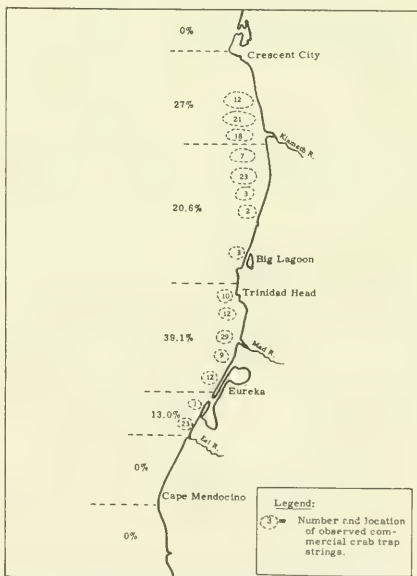


Fig. 1 - Airplane Spotting Flight Cessna 182, 60-2 Crab (January 20, 1960), to study crab fishing areas and intensity of fishing.

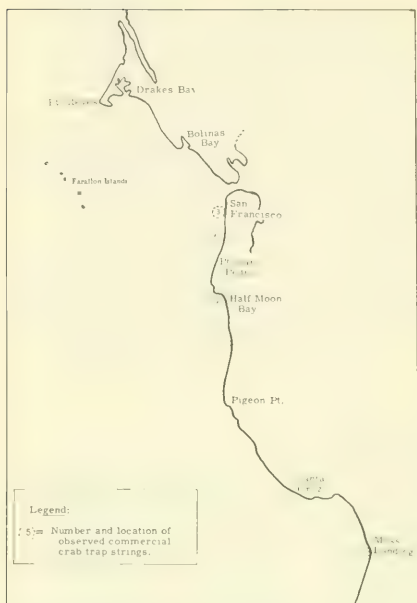


Fig. 2 - Airplane Spotting Flight Cessna 182, 60-2-Crab (January 21, 1960), to study crab fishing areas and intensity of fishing.

Light and sea conditions were good during the northern part of the survey--Cape Mendocino to the California-Oregon border. Rain and high seas on the second day created poor observation conditions during the southern part of the survey--Monterey to the Russian River. These conditions forced eventual flight cancellation, limiting the southern survey to the area between Monterey Bay and Drakes Bay.

A total of 207 strings of crab gear was counted during the 2-day survey: 184 in the northern area and 23 in the southern area. The greatest concentration of gear in the northern area was between Eureka and Trinidad Head (39.1 percent) with lesser concentrations between Crescent City and the Klamath River (27.7 percent) and between the Klamath River and Freshwater Lagoon (19.0 percent). Although relative intensity of fishing could not be determined for the southern area due to poor visibility, concentrations of gear were observed at Half Moon Bay and north of Pt. San Pedro.

Airplane Spotting Flight 60-4-Crab: The survey of the commercial crab fishing areas from Monterey to the California-Oregon border was continued March 14-15, 1960, to determine the fishing localities and the relative density of crab gear of the northern California crab fleet.

A total of 310 lines of crab gear were counted during the 2-day survey, 122 (39 percent) in the southern fishery and 188 (61 percent) in the north-

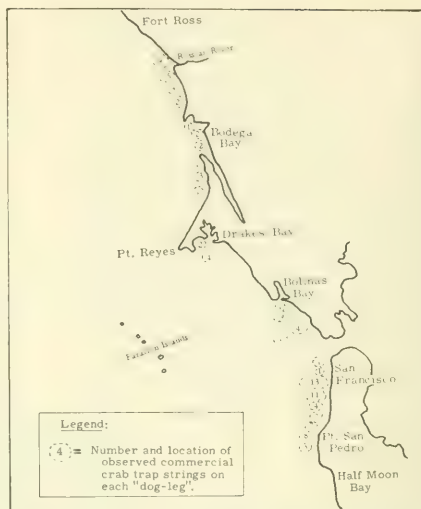


Fig. 3 - Airplane Spotting Flight Cessna 182, 60-4-Crab (March 14, 1960), to study fishing areas and intensity of fishing.

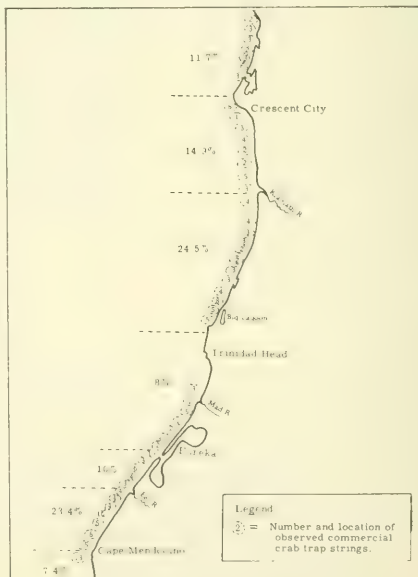


Fig. 4 - Airplane Spotting Flight Cessna 182, 60-4-Crab (March 15, 1960), to study fishing areas and intensity of fishing.

ern fishery. In the southern crab fishery most of the trap strings (51.6 percent) were observed between the Golden Gate and Pillar Pt.

In the northern fishery about half of the gear was north of Trinidad Head and half south. Shifts in gear had taken place since the January 20 flight and there were fewer sets--down 31 percent off Eureka and more--up 31 percent--south of the Eel River. There was also an apparent shift of gear to the area north of Crescent City--up 12 percent--from the Klamath River-Crescent City area--down 13 percent.

Notes: Also see Commercial Fisheries Review, May 1960, p. 15.

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BARRACUDA AND WHITE SEA BASS SURVEY CONTINUED IN GULF OF CALIFORNIA, MEXICO:

M/V "Alaska" Cruise 60A1-Barracuda-White Sea Bass: The Gulf of California, Mexico, area was surveyed (January 19-February 9, 1960), by the California Department of Fish and Game research vessel Alaska; (1) to explore for and collect specimens of white sea bass, *Cynoscion nobilis*; (2) to make oceanographic observations; (3) collect sardines; (4) to give general assistance to the University of California at Los Angeles field party; and (5) to collect live oysters and other shellfish for possible transplanting into southern California waters.



M/V Alaska Cruise 60A1-Barracuda-White Sea Bass (January 10-February 9, 1960).

Weather, a primary factor of all field expeditions, was of a generally favorable nature, permitting accomplishment of all the basic objectives. Only one of three major disturbances hampered operations. The other two storms occurred en route to and from the Gulf. On a few occasions strong winds restricted fishing to protected bays. Short winter days and great distances limited activities.

SEA BASS--OCEANOGRAPHIC OBSERVATIONS:

Gill nets were the major fishing or sampling tool used in the search for white sea bass. An average of five nets per night (range 3 to 8) were fished at 14 different localities from San Jose Island in the south to Punta San Fermin in the north, including Angel de la Guardia, San Esteban and Tiburón Islands. In all 68 gill nets were set, at various depths ranging from 75 fathoms several miles from land to shallow waters close to shore. At each location nets were set in as many different habitats as time and equipment permitted.

A total of 20 white sea bass was taken in gill nets at Tiburón Island, was along the western side of the Gulf from San Francisquito Bay northward. The coastal waters along the Mexican mainland were not fished. Sport and commercial fishermen, however, report taking them along the mainland coast from Guaymas north. All the fish were taken close to shore in depths ranging from 3 to 15 fathoms. The water temperatures, at point of capture, ranged from 14.3° to 16.0° C. (57.7° to 60.8° F.). A catch of 13 sea bass near Monument Point, Tiburón Island was the exception to the generally solitary catches in the other areas. These fish were of medium to large size ranging from 746 to 1,385 mm. total length (29.3 to 54.5 inches). In general, the larger individuals were taken in the northern and warmer sections: San Luis Gonzaga Bay and Pt. San Fermin. The gonads were in various stages of development, up to and including a running ripe female. Attempts to fertilize the eggs from this ripe fish proved futile, perhaps due to the lack of mature sperm.

Morphometrics were taken of all the white sea bass while in the fresh state. These data will be used for comparison with the original description of *Cynoscion nobilis*. Eleven of the 20 fish were frozen for detailed comparisons with specimens from California waters. Scales of all were saved for age analysis. Of 11 stomachs examined, all were empty.

South of the Gulf's mid-section, below San Francisquito Pt., fishing in 3 widely separated localities did not yield white sea bass or any other sciaenids, although many are known to inhabit these waters.

A fish trap was baited and set in rocky habitat at 8 localities. No white sea bass were taken with this gear. Hook and line fishing at each anchorage and from a skiff at various places also failed to produce sea bass.

Hydrographic observations were limited to: water temperatures taken with recording and bucket thermometers, thermarine recorders and a Hubbs' casting thermometer, and water samples for salinity determinations.

The surface water temperatures registered 19.0° C. (66.2° F.) in the vicinity of La Paz, grad-

ually cooled to a low of 13.6°C . (56.5°F .) in the Gulf's mid-section and warmed slightly to 16.0°C . (60.8°F .) in the upper Gulf off Pt. San Fermin. Vertical temperatures of the upper Gulf from bathythermograph tracings were relatively uniform at 14° to 16°C . (57° to 61°F .). Around Angel de la Guardia, San Esteban and Tiburon Islands, areas influenced by strong currents, a large deep body of water of even temperature was also evident; however, it was slightly colder than the waters to the north ranging from 13° to 15°C . (55.4° to 59.0°F .). In general, these observations agree with predictions of the situation in the upper Gulf for this time of the year. A more refined analysis will be available with the processing of the salinity samples by the Scripps Institution of Oceanography.

To aid the Scripps Institution of Oceanography's study of the surface currents, 96 drift bottles were released at various points, primarily in the upper Gulf where the white sea bass were found.

The above ecological observations indicate that a major portion of the upper Gulf is available, temperaturewise, to the white sea bass population for at least part of the year. Recent studies by Scripps indicate that favorable thermal habitat is available throughout the year in the central areas.

SARDINES: Sardines were found at 2 localities, off the southeast end of Angel de la Guardia Island on January 23 and at Pt. San Fermin on the night of January 31-February 1. In neither instance was it possible to obtain live fish, and samples of about 25 fish each were preserved for the Pelagic Fish Investigation's racial studies. The school of sardines at Angel de la Guardia Island was small and wild and remained under the night light only for a short period. These fish were collected with hook and line using Paulas' lures. The presence of sardines at Pt. San Fermin was not detected until about midnight when a small sampling gill net was hauled from under the night light. These fish were mixed with other species, including grunion and jack smelt. The surface water temperatures in both places at time of collection was similar, ranging from 15.7° to 16.6°C . (60.3° to 61.9°F .).

UNIVERSITY OF CALIFORNIA AT LOS ANGELES: The UCLA field party of four, and a biologist of the California Department of Fish and Game joined the cruise at San Luis Gonzaga Bay on January 22 and left at the same place on January 30. They were transported to the central islands, where four major collecting sites were occupied; 2 on Angel de la Guardia Island, Puerto Refugio and the southeast end; 1 at San Esteban Island and 1 at Tiburon Island. Good collections of fish were made at each locality, utilizing gill nets, hook and line, trawl gear, and rotenone.

OYSTERS: No live oysters or other shellfish suitable for transplanting into southern California waters or the Salton Sea were found. In fact the only oysters observed were fossils, having expired about 20,000 years ago.

BARRACUDA: The different activities yielded a wide variety of fish besides the white sea bass. Of prime interest to the project was the capture of a number of barracuda, *Sphyræna* sp., at several widely separated localities between San Jose Island and San Luis Gonzaga Bay. It appears that this small undescribed barracuda is the only one

in the Gulf, for *Sphyræna argentea* has not been taken here and *S. ensis* is reported only from the very southern end. *Sphyræna* sp. also occurs on the outer coast of Baja California at least as far north as Cedros Island.

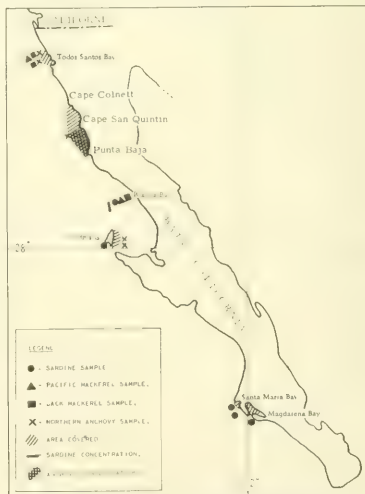
Note: Also see *Commercial Fisheries Review*, January 1960, p. 28.

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PELAGIC FISH POPULATION SURVEY CONTINUED:

M/V "Alaska" Cruise 60A2-Pelagic Fish: The coastal waters off Baja California from Todos Santos Bay southward to Magdalena Bay, were surveyed (February 18-March 3, 1960) by the California Department of Fish and Game research vessel Alaska to collect samples of sardines for genetic studies in cooperation with the U. S. Fish and Wildlife Service. The genetic studies include (a) serological tests to delimit the ranges of sardines possessing northern and southern blood "types." (The "northern type" was found off central California and the "southern type" off southern California prior to the fishing season. Since the 1959 season opened in September, sardine samples all have been of the northern type); and (b) detailed morphometric studies, on the above fish, to find morphological characters which may be related to genetic types. Other objectives were to collect sardine specimens for fecundity studies; and to make incidental collections requested by other investigations.

A total of 47 night light stations was occupied. Sardines were collected at 5 stations, northern anchovies at 5, jack mackerel at 3, and Pacific mackerel at 2 stations. The 5 sardine samples were combined into 3 areas (Blanca Bay, Cedros Island and Magdalena Bay) for the genetic study. Serological tests indicated that all sardines sampled were of the "southern type".



M/V Alaska Cruise 60A2-Pelagic Fish (February 18-March 3, 1960).

Approximately 100 large sardine schools were observed 30 miles NNW. of Cedros Island. Very few sardines were seen in any other areas.

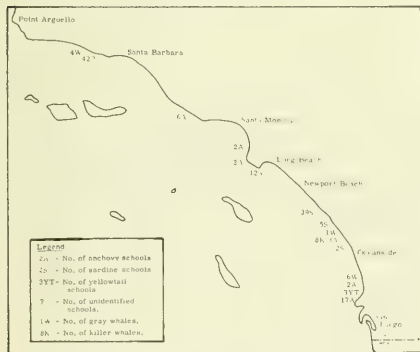
Small anchovies were observed scattered on the surface continuously from Punta Baja to Cape San Quintin, a distance of about 25 miles. Concentrated schools were interspersed within these scattered anchovies. Some fish were caught by holding a brail over the side while under way. In this area anchovies would "flip" and disappear the instant the night light was turned on. However, one light station attracted fish and 4,500 were captured in one blanket net set.

Sea surface temperatures ranged from 12.4°C . (54.3°F .) at San Quintin Bay to 17.15°C . (62.9°F .) at Magdalena Bay. In general, surface temperatures were cooler than those observed in 1959.

Airplane Spotting Flight 60-3-Pelagic Fish: The inshore area from the California-Mexico border north to San Francisco Bay were surveyed from the air (February 15-18, 1960) by the Department's Cessna 180 (3632C) to determine the distribution and abundance of pelagic fish schools.

Weather and visibility conditions were perfect for the first three days but a storm on the fourth day made over-water observations impossible.

No large concentrations of schools were seen in the area surveyed and none was found north of Pt. Arguello. Good coverage of Monterey Bay and the area between Monterey Bay and San Francisco was possible but not a single school was found.



Airplane Spotting Flight 60-3 (February 15-18, 1960).

Only 32 anchovy schools were observed, and of these, 17 were concentrated in a "school group" near La Jolla Pt. while the rest were scattered from La Jolla to just north of Pt. Dume.

Two small groups of sardines were seen, the largest (39 schools) was 4 miles south of Abalone Pt., Laguna Beach, and the other (12 schools) was 2 miles offshore between Pt. Vicente and Pt. Fermin. An additional 7 schools were scattered between Oceanside and San Clemente.

Twelve migrating gray whales in various places, 8 killer whales off Camp Pendleton and 3 schools of yellowtail off La Jolla Pt. were seen.

A group of 42 large, deep, unidentified schools was seen near Coal Oil Pt., Santa Barbara. It is presumed that these schools were composed of sardines or Pacific mackerel but positive identification was not possible.

The water in the area surveyed was generally clean and blue-green in color. Many birds and large amounts of floating kelp were observed in southern California. Kelp beds appeared to be in particularly poor condition.

Airplane Spotting Flight 60-5-Pelagic Fish: The aerial survey was continued (March 14-16, 1960) along the inshore area from the Mexican border to San Francisco Bay, by the Department's Cessna 180 (3632C) to determine the distribution and abundance of pelagic fish schools.

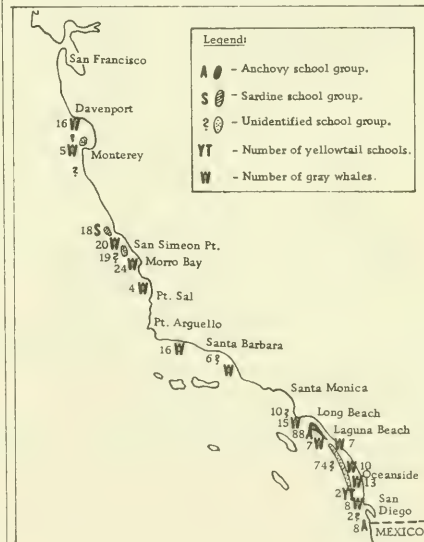
Weather, visibility, and water conditions were generally very good. A total of 244 schools of fish was observed during the flight. Of these, 96 were identified as anchovies, 18 as sardines and 2 as yellowtail. The remainder was not positively identified.

Anchovies were found between Huntington Beach and Laguna Beach (88 schools) and off Pt. Loma (8 schools).

The 2 yellowtail schools were seen off La Jolla Point in almost the exact spot where 3 schools of yellowtail were observed during the February flight.

A small group (18 schools) of sardines was found just north of San Simeon, 2 miles off Sierra Nevada Point.

The majority of the identified schools (74) was seen while flying a straight course between La



Airplane Spotting Flight 60-5 (March 14, 15, and 16, 1960).

Jolla and Laguna Beach, approximately 5 miles offshore. Although not positively identified, these schools behaved in a manner typical of sardines or mackerel. Ten, large, deep, purple-colored spots were seen about 2 miles off Point Vicente. Large quantities of jack mackerel were taken in this general area a few days after the survey. Only 16 schools were seen in Monterey Bay; they were quite deep and remained unidentified.

Migrating California gray whales were observed from Monterey Bay to San Diego. They occurred singly or in groups of up to 10. A total of 131 was counted and all were moving up the coast.

Note: Also see Commercial Fisheries Review, March 1960, p. 17.



Canned Fish

DISTRIBUTION OF CANNED TUNA, SALMON, AND SARDINES:

A shipper survey of canned tuna, salmon, and sardines was recently finished by the U. S. Bureau of the Census for the U. S. Bureau of Commercial Fisheries. The purpose was to obtain data on the (1) geographic location of the market; (2) the commodities that are moving, including number of cases by can size and type, and the class of customer; (3) how much of the pack moves into multi-unit retail food channels, how much into Government, and how much into all other channels. The data are based on shipments in the 12 months ended June 30, 1959.

The study shows that about 23 million standard cases of canned fish were shipped during the twelve months. Canned tuna comprised more than half of the total--about 13 million cases. Shipments of canned salmon



and sardines accounted for 5 million cases each.

Distribution of canned tuna and sardines was largest in the Pacific region, accounting for 27 percent and 16 percent of total shipments, respectively, in that area. California received the largest proportion of both canned tuna and canned sardine shipments which eventually are further distributed. Distribu-

tion appeared largest in this region because there is a movement from canner to warehouses in the case of tuna and sardines, and for export from California for sardines.

The East North Central Region (Ohio, Indiana, Illinois, Michigan, and Wisconsin) received 23 percent of total shipments of canned salmon. On the West Coast, Washington received 13 percent of total shipments.

Chunk style tuna accounted for 61 percent of total tuna shipments. The one-half pound (6½-7 oz. net weight of contents) can pack represented 85 percent of tuna shipments. About 39 percent of total tuna pack moved into multi-unit retail food channels, 3 percent channeled through Government, and 58 percent into all other channels.

Red and pink salmon, in almost equal amounts, comprised about 67 percent of total salmon shipments. The one-pound can was the most popular pack for salmon, representing 65 percent of distribution. The multi-unit purchasers distributed 23 percent of canned salmon, with only 1 percent channeled through Government, and 76 percent into all other channels.

The distribution of sardines by style of pack was 38 percent oil pack; 24 percent tomato sauce; 6 percent mustard, and the remainder unidentified. Keyless sardines accounted for 93 percent of all sardine shipments with 56 percent packed in one-pound cans. Almost all of the sardines packed with key were distributed in the ¼-pound-can sizes, with oil pack amounting to two-thirds of this distribution. About 17 percent of all canned sardines were distributed through multi-unit retail outlets, 1 percent through Government, and the remainder through other channels.



Cans--Shipments for Fishery Products, January-February 1960

Total shipments of metal cans during January-February 1960 amounted to

13,609 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 12,445 tons in the same period a year ago. Canning of fishery products in January-February this year was confined largely to tuna, shrimp, Gulf oysters, plus a substantial increase in the canned pack of jack and Pacific mackerel.

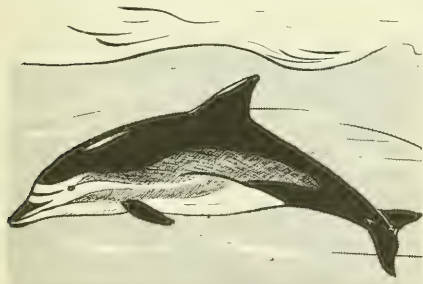
Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.



Central Pacific Fishery Investigations

ALTERATIONS OF RESEARCH VESSEL "CHARLES H. GILBERT":

An underwater observation chamber has been installed in the bow of the re-



Dolphin (*Delphinus bairdi*).

search vessel Charles H. Gilbert of the U. S. Bureau of Commercial Fisheries Biological Laboratory at Honolulu. Use was made of the bow chamber in observing porpoises riding the vessel's bow wave. Their posture while riding the bow wave was a curious one--a rigid arc with both head and tail depressed. This was quite different from the suggested

posture where the tail is turned upward in the bow wave; in fact, the observed posture seemed most inappropriate for its apparent function, that of utilizing a pressure wave at the vessel's stern for a free ride.

Shipyard alterations of the Charles H. Gilbert were completed on April 18, 1960, at Portland, Oreg. These alterations included a new main engine, new quarters and laboratory space, a new pilothouse, the installation of a trawling winch and provisions for handling large trawls overside, and the underwater observation chamber.

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HAWAIIAN SKIPJACK TUNA RESEARCH TRENDS, MARCH 1960:

Skipjack size measurements made by biologists of the Honolulu Laboratory of the U. S. Bureau of Commercial Fisheries showed two weight groups to be present in the catch. The most abundant group had a mode at 25 pounds; the other had a mode at 8 pounds. There was also an ill-defined group with a mode at 4.5 pounds.

The estimated March total Hawaiian landings of 310,000 pounds of skipjack were slightly above average for the month. The 1960 data show that the landings through March were composed of small to very large fish. Approximately 50 percent of the catch was fish of less than 10 pounds; 30 percent, fish of more than 22 pounds. This comparatively high percentage of large fish is somewhat typical for the January-March period.

The captive skipjack continue to thrive. Five 2-pound skipjack captured on February 27 and one 6-pound skipjack captured on February 15 are actively feeding on frozen shrimp and squid. With the successful maintenance of these tuna in captivity, plans were made during the month for construction of larger tanks in order that the conditioned response studies may be accelerated.

Note: Also see Commercial Fisheries Review, January 1960, p. 30.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-MARCH 1960:

Fresh and Frozen Fishery Products:
For the use of the Armed Forces under the Department of Defense, 1.9 million

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, March 1960 with Comparisons

QUANTITY				VALUE			
March 1960	Jan.-Mar. 1959	March 1960	Jan.-Mar. 1959	March 1960	Jan.-Mar. 1959	March 1960	Jan.-Mar. 1959
1,934	2,023	5,248	4,949	1,081	1,179	2,730	2,800
(1,000 Lbs.)				(\$1,000)			

pounds (value \$1.1 million) of fresh and frozen fishery products were purchased in March 1960 by the Military Subsistence Supply Agency. This exceeded the quantity purchased in February by 6.4 percent, but was 4.4 percent under the amount purchased in March 1959. The value of the purchases in March 1960 was higher by 18.5 percent as compared with February, but 8.3 percent less than for March 1959.

During the first three months of 1960 purchases totaled 5.2 million pounds (valued at \$2.7 million)—an increase of 6.0 percent in quantity, but lower by 2.5 percent in value as compared with the similar period in 1959.

Prices paid for fresh and frozen fishery products by the Department of Defense in March 1960 averaged 55.9 cents a pound, about 6.1 cents above the 49.8 cents paid in February but 2.4 cents less than the 58.3 cents paid during March 1959.

Canned Fishery Products: Tuna was the principal canned fishery product purchased for the use of the Armed Forces

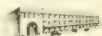
Table 2 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, March 1960 with Comparisons

Product	QUANTITY				VALUE			
	March 1960	Jan.-Mar. 1959	March 1960	Jan.-Mar. 1959	March 1960	Jan.-Mar. 1959	March 1960	Jan.-Mar. 1959
	252	116	11,269	869	122	58	573	387
Tuna	15	228	46	265	6	27	20	40
Salmon								
Sardines								

during March this year. In the first three months of 1960, purchases of canned tuna were up 46.0 percent in quantity and 48.1 percent in value, but purchases of canned sardines were down about 82.6

percent in quantity and 50 percent in value as compared with the same period in 1959. No canned salmon was purchased during January-March 1960 and 1959.

Note: Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated because local purchases are not obtainable.



Fisheries Loan Fund

LOANS APPROVED MARCH 1-31, 1960:

As of March 31, 1960, a total of 735 applications for fisheries loans totaling \$22,657,331 had been received since the program was started. Of these, 395 (\$9,105,588) have been approved, 249 (\$6,891,314) have been declined or found ineligible, 58 (\$2,505,756) have been withdrawn by applicants before being processed, and 33 (\$3,116,722) are pending. Several of the pending cases have been deferred indefinitely at the request of the applicants. Sufficient funds are available to process new applications when received.

The following loans have been approved during March 1960:

New England Area: Michael B. Smith, New Bedford, Mass., \$60,000.

South Atlantic and Gulf Area: John J. Ross, Biloxi, Miss., \$40,112.

California: Darrel W. Furber, Arcata, \$4,672; Bernard Ostfeld, Fort Bragg, \$13,000; Frank Medina, et al, San Diego, \$110,000; and Inez Peterson, et al, San Diego, \$80,000.

Pacific Northwest Area: Kenneth Knaak, Newport, Oreg., \$23,700; Harvey Benedict, Olympia, Wash., \$4,000; Donald A. Simson, Seattle, \$6,000; and Richard S. King, Tacoma, Wash., \$8,470.

Great Lakes Area: Clare A. Thomas, Unionville, Mich., \$7,200.

Alaska: William Spaulding, Auke Bay, \$4,000; William H. Dore, Douglas, \$6,500; W. H. James, Halibut Cove, \$5,200; Moss Brothers, Homer, \$3,400; Ernest O. Rude, Juneau, \$3,500; Ben H. Fleenor, Ketchikan, \$3,500; John R. Malutin, Kodiak,

\$7,600; Oscar Dyson and Seldon Nelson, Kodiak, \$18,000; Howard Ulrich, Pelican, \$2,500; Marion L. Frink, Petersburg, \$15,000; James R. Post, Petersburg, \$11,670; and Robert O. Brown, Sitka, \$4,000.



Fishery Export Trade Promotion Meeting Announced

A fishery export promotion conference, sponsored by the U. S. Department of the Interior in cooperation with the Department of Commerce, was scheduled for June 20, 1960, in the Interior Building, Washington, D. C. The meeting is a part of a series of conferences being held with private trade interests under the Executive Department's program to promote the expansion of United States exports. Various Government departments have been asked to improve their services in the development of new markets overseas and to enlist the efforts of private business in expanding sales abroad. Among other things, steps will be taken to strengthen the trade promotion services of the Government, to expand and give priority to the commercial activities of the Foreign Service, to place greater emphasis on the prompt reporting of information useful to American exporters, to establish new overseas centers, and make full use of trade fairs, trade missions, and other means of stimulating the interest of foreign buyers in United States products.

The Department of the Interior is seeking to get the views and active support of the fishing industry. At the meeting, consideration was given to the present export situation. Advice was obtained of representatives from the fishing industry as to specific moves the Government might undertake to give maximum assistance to increasing sales of fishery commodities abroad. The objective was to identify specific impediments to increased export trade and to attempt to evaluate the additional sales that might result if those impediments were removed or modified.

Also requested were suggestions for specific reductions in tariffs imposed by

foreign countries which will be of the greatest benefit to exporters of fishery products. Considerable progress has already been made in the relaxation of quantitative trade controls, exchange restrictions, and other barriers to the flow of American goods abroad, but advice on specific problems in individual countries was sought from industry sources. Suggestions from industry will be helpful to those responsible for developing instructions to U. S. representatives at tariff negotiations and international meetings dealing with trade restrictions.

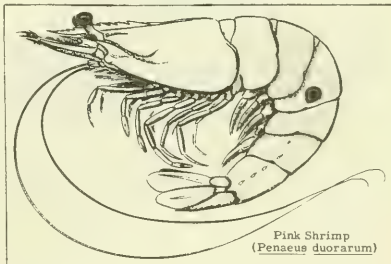


Florida

PINK SHRIMP--MOST VALUABLE COMMERCIAL FISHERY:

The pink shrimp, Florida's most valuable commercial fishery, is the subject of an interesting report of the results to date of shrimp research conducted by The Marine Laboratory of the University of Miami. This research was started in 1952 and is sponsored by the Shrimp Association of the Americas, the U. S. Fish and Wildlife Service, and the Florida State Board of Conservation.

Much of the knowledge sought in the research is produced through tagging operations on the fishing grounds from catches of commercial fishing craft. It has been found that the female pink shrimp have an estimated winter growth of five counts per pound per month, while the males grow seven counts. Counts signify the number of shrimp per pound with heads off. Also, considerable was learned of the migrations of the shrimp. One shrimp from the experiment at Flamingo was recovered just north of Key West. It had been out 123 days and had traveled about 60 miles in a straight-line distance from where it had been tagged. The importance of this recovery lies in the support it provides to the theory that the Everglades National Park estuary is the nursery ground which supplies the Tortugas grounds.



Pink Shrimp
(*Penaeus duorarum*)

The majority of the recoveries of tagged shrimp is made within 10 miles from the point of tagging. The majority of recoveries of both sexes is made within 50 days. It has been found that the net movement of shrimp is generally northwesterly on the Tortugas grounds.

Figures on shrimp catches in Florida reveal that the State is second in production in the United States, being exceeded only by Texas. In 1958, latest year for which complete data are available, the shrimp fishermen of Florida produced 51 million pounds of all types of shrimp.

The value of the shrimp catch was \$18,518,000 as compared with \$29,353,000 for the total value of all of Florida's salt-water fisheries landings.

The principal grounds for the pink shrimp is an area of about 1,500 miles immediately west of the tip of Florida between Key West and Dry Tortugas. There are other species of shrimp on the Tortugas grounds besides the pink shrimp, but the pink shrimp is the only species that is at all common in the catches made there.

Shrimp fishing on the Tortugas grounds is by otter trawls and the principal ports at which the catches are landed are Key West, Marathon, Naples, and Fort Myers. The larger shrimp are taken for food, but there is also a considerable fishery for smaller shrimp which are used as bait, mainly by anglers.

The research conducted is designed to learn about the life history of the shrimp, including knowledge of its early life and feeding habits, growth and mortality, spawning behavior, migration, and about the fish predators that feed on it. Only by ascertaining such data can proper management of the shrimp fishery be undertaken.

The Tortugas shrimp grounds are bounded on the south and west by deep water which appears to be a natural barrier to their movement in those directions. To the east the shallow waters of Florida Bay contain small shrimp and from this area the majority of pink shrimp is believed to migrate to the Tortugas grounds. To the north is an area which is largely untrawlable, probably providing protection to the main population of pink shrimp.



Frozen Fish

RESTAURANT CHAINS USE HALF-BILLION POUNDS OF FROZEN FOOD A YEAR:

Chain restaurants are using more frozen foods than ever before in history,



according to a survey made by the Restaurant Editions of Chain Store Age magazines. Questionnaires returned to Chain Store Age by top food service executives in the chain drug, chain variety store, chain restaurant, and chain employee feeding fields reveal that 129,410,520

pounds of frozen meat, 179,923,920 pounds of frozen vegetables, 83,563,596 pounds of frozen fruit, and 96,440,504 pounds of frozen fish were used yearly by a total of 16,036 chain food service installations around the United States.

Forty major restaurant chains operating a total of 2,916 units reported to Chain Store Age that frozen fish was used in 2,666 units.

The most popular types of frozen fish, according to the Chain Store Age survey, are haddock (used in 2,028 out of 2,666 units reporting), fillet of sole (1,187 units), shrimp (794), halibut (562), trout (373), scallops (282), cod (169), swordfish (144), and ocean perch (116).



Fur Seals

PRICES FOR ALASKA FUR-SEAL SKINS AT SPRING AUCTION:

At the semi-annual auction sale of Alaska fur-seal skins held in St. Louis on April 9, 1960, a total of 22,561 United States-owned fur-seal pelts was sold for \$2,293,580 for the account of the United States Government. The skins are products of the sealing operations of the U. S. Bureau of Commercial Fisheries on the Pribilof Islands.

U. S.-owned fur-seal skins offered and sold at this auction were 1,457 skins less than the number sold at the last sale (October 23, 1959) with the total value of the skins down by 7.5 percent, and average price per skin lower by about 1.5 percent. At the 1959 spring auction held on April 10, 24,578 United States-owned fur-seal skins were sold for \$2,451,562 and the average price per skin was \$99.75.

The auction's average prices for the skins by types were: dark-brown or matara \$99.34 per skin, black \$104.43, and the dark shade kitovi \$102.00. The average for all United States skins was \$101.66 per skin, or 2.0 percent per skin higher than the average price paid per skin at the 1959 spring auction. Japanese Government Alaska fur-seal skins sold: black \$105.81, matara \$97.47, total average \$99.99. All South Africa fur-

seal skins averaged \$45.98. Uruguay skins averaged \$50.18.

The sales of all fur-seal skins at this spring auction yielded \$3,656,706.50.

Note: Also see Commercial Fisheries Review, December 1959 p. 49, and June 1959 p. 35.



Maine Sardines

CANNING SEASON FOR 1960 OPENS WITH NO SIGNS OF FISH:

The 1960 Maine sardine canning season legally opened on April 15, but no factories were in operation nor were likely to be until the latter part of May.

Veteran cannerymen and fishermen saw no signs of sardine herring showing up along the coast for several weeks. This has been the pattern for the last few years. In 1959 the first fish in sizable volume were not taken until early June.

The Maine Sardine Council's Executive Secretary said that the same 31 plants that operated along the coast in 1959 from Portland to Robbinston were being put into readiness.

He said that the industry had a production goal of about 2,000,000 cases versus the 1959 short pack of 1,750,000 cases which was caused by a scarcity of fish.

The industry's inventory situation is a favorable one with many types and varieties of pack completely sold out. Prices and demand for the 1959 production have remained firm for the past several months, the Executive Secretary stated.

He said that there had been an increased demand for institutional and

military-type packs as a result of sales and promotional work by the Council. Further increases in the demand for these packs are expected in 1960.

* * * * *

ADVERTISING AIMED AT YOUTH EDUCATION:

The romantic story of Maine's \$20 million sardine industry is now being told in comic book format by the Maine Sardine Council.



This activity, aimed at school children as an educational feature, consists of several hundred thousand, eight-page, four-color booklets.

Appropriately entitled "Ricky and Debbie in Sardineland," the drawings take two attractive big city youngsters for a tour of the fishing grounds and canneries as well as a look into the past and future of the industry.

The Executive Secretary of the Council states that the booklets would be dis-

tributed free through schools, supermarkets, and other outlets.

"This is but one phase of a youth education program which we started last year in an effort to interest children in our industry and its products," the Secretary stated.

Other activities include a film strip on the industry and the use of home economists to introduce nutritious, low-cost sardine recipes in the school-lunch programs.



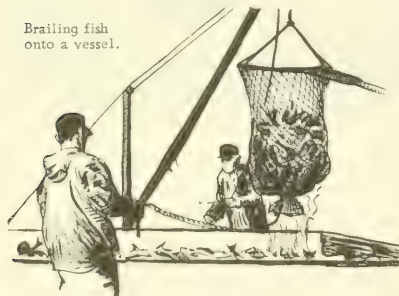
Marketing

EDIBLE FISHERY PRODUCTS MARKETING PROSPECTS, SPRING-EARLY SUMMER 1960:

United States civilian per capita consumption of fishery products this spring and early summer is expected to be about the same as a year earlier. Some increase is likely for the fresh and frozen products, offsetting a prospective reduction for the canned. Retail prices of fishery products as a group are expected to continue lower than last year because of a likely reduction for the fresh and frozen products.

Total commercial landings of fish and shellfish as of May 1 were well on the

Brailing fish
onto a vessel.



seasonal uptrend, and should continue to expand into the summer. Supplies of canned fishery products will remain below those of a year earlier at least until late summer when marketings of the sea-

sonally packed items--such as salmon and sardines--are at a high level. Canned tuna stocks currently are well below those of a year earlier, but this product is packed throughout the year. Cold-storage holdings of edible frozen fishery products were a little larger this April 1 than last. Such stocks usually are at the year's low-point in mid-spring, and then start building up seasonally.

Imports of edible fishery products are expected to continue at a high level. In 1959 they were equivalent to half of our total domestic production of food fish and shellfish.

This analysis appeared in a report prepared by the Agricultural Marketing Service, U. S. Department of Agriculture, in cooperation with the Bureau of Commercial Fisheries, U. S. Department of the Interior, and published in the former agency's May 9, 1960, release of The National Food Situation (NFS-92).



North Atlantic Fishery Investigations

SPAWNING HABITS OF HADDOCK STUDIED ON GEORGES AND BROWNS BANKS:

M/V "Delaware" Cruise 60-4: A survey of the spawning habits of haddock on Georges and Western Nova Scotia Banks between 64° and 67° W. longitude was conducted (March 23-April 2, 1960) by the U. S. Bureau of Commercial Fisheries research vessel Delaware.

Surface and oblique plankton tows were made at 32 stations, primarily to assess the distribution of cod and haddock eggs. Samples of eggs collected were incubated to determine species composition. Trawling operations with the No. 36 trawl and the Breidfjord float-trawl were conducted at 4 stations. Bathythermograph casts and standard oceanographic observations were made.

On Georges Bank about 1,000 eggs a tow were taken and to the eastward about 200 a tow. Most eggs appeared to be about 7-10 days old. On Browns Bank about 95 percent of early stage eggs appeared dead or dying.

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North Pacific Exploratory Fishery Program

MODIFIED OTTER-TRAWL EXPERIMENTS CONTINUED:

M/V "John N. Cobb" Cruise 45: Fishing gear development experiments were conducted by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb for 52 days. Tows were made on commercial trawling grounds off Destruction Island to Cape Flattery, Wash. The vessel returned to port on April 15, 1960. The work was a continuation of the otter-trawl modification project initiated in February 1959. Two types of modified otter trawls were tested: one, a "free-wing trawl," designed to increase the horizontal opening; and the other, a "blanket trawl" designed to increase the vertical opening. The experimental trawls were tested alternately on commercial fishing grounds with a standard 400-mesh Eastern trawl over the same bottom. In addition, preliminary experiments with an electrical catch-load-indicator were conducted.

In 22 tows (11 with the "free-wing trawl" and 11 with a standard trawl) the

comparative tows. Towing speeds varied from 1.6 to 2.8 knots (ground speed).

The "blanket" modification was compared on 13 tows--7 tows with the experimental gear and 6 with a standard trawl. Apparently the fish were capable of avoiding the "blanket trawl" since catches were consistently considerably lower than those with the standard gear. These tows were made on commercial rockfish grounds. Ground speeds ranged from 1.8 to 3.0 knots.

During the frequent periods of stormy weather offshore, instrumentation experiments were performed in the sheltered waters of the Straits of Juan de Fuca. Using the electrical trawl cable and accessory gear, tests were conducted to determine the feasibility of using instrumentation to provide a continuous catch-magnitude indication. These trials indicate that an electrical dynamometer placed on the cod end will indicate on an ammeter the progressive build-up of catch, the lack of catch, or a loss of catch.

Note: Also see Commercial Fisheries Review, June 1959 p. 44.

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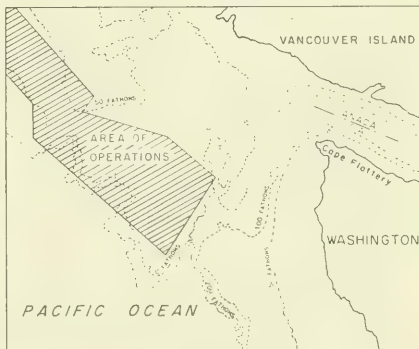
EXPLORATORY BOTTOM-FISH TRAWLING OFF COAST OF WASHINGTON AND VANCOUVER ISLAND PLANNED:

M/V "John N. Cobb" Cruise 46: Bottom-fish trawling is the purpose of the cruise scheduled for the U. S. Bureau of



Fig. 1 - The U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb.

experimental gear did not produce significantly greater catches of flatfish. Modifications to the experimental gear late in the trip improved catches considerably; however, there was insufficient time for an adequate number of



Operational Area - Cruise 46 - M/V John N. Cobb.

Commercial Fisheries exploratory fishing vessel John N. Cobb during May and June. The vessel left May 2 for eight weeks of exploratory fishing off the Washington and Vancouver Island coasts.



Oceanic Bacteria

UNIVERSITY OF MIAMI GRANTED FUNDS FOR EXTENSION OF RESEARCH:

A grant of \$30,000 has been made to The Marine Laboratory of the University of Miami by the National Institutes of Health to cover the costs of a four-year extension of studies of bacteria found in the ocean.

These bacteria, some of a distinct orange and red coloration, are toxic to fishes and sometimes kill them in large numbers. The studies concern the general biology of these bacteria which are found in the sediments and plant and animal waste in the ocean. The research is designed to ascertain just what part they play in the life contained in the ocean.



Oysters

HEAVY LOSSES DISCOVERED IN LOWER CHESAPEAKE BAY:

Early in April this year, oysters were dying heavily in certain parts of the lower Chesapeake Bay. Virginia biologists have discovered that the same organism which was associated with Delaware Bay mortalities is present in the area. While some lower Chesapeake growers suffered a heavy death rate in 1959, the general feeling was that most of the losses were attributable to the fungus Dermocystidium. This spring deaths are not from this cause since this fungus attacks oysters primarily at the end of an extended period of hot weather.

Many biologists at the Virginia Fisheries Laboratory are devoting all their energies to determine the distribution of the suspected killer, with the hope that it can be confined to the area in which it is currently known to exist.

There has been a great deal of speculation among the people in all the Chesapeake area. Since the area of high mortality is located in areas of relatively high salinities it is hoped that the lower salinity beds will not be attacked.

* * * * *

VIRGINIA BIOLOGISTS USE AUTO- TECHNICON TO SPEED UP RESEARCH:

Automation at the Virginia Fisheries Laboratory, Gloucester Point, is now allowing scientists to examine oysters twice as fast as in the past. A newly-installed Autotechnicon mechanically processes slides of oyster tissue, leaving the technicians free to prepare more oysters for the Autotechnicon to process.

According to the chief marine microtechnician, who has personally prepared about 2,000 slides of 1,500 oysters during the past year, "The Autotechnicon frees me from much of the drudgery of slide preparation. The two of us should be able to prepare oyster tissues for the scientist to read twice as fast as I could do it alone."

One of the most important though time-consuming problems of the Laboratory has been to discover the causes of oyster mortalities which have plagued the industry for many years. A major breakthrough occurred several years ago as a result of the significant work done by a Laboratory biologist and his associates in learning that Dermocystidium accounts for the deaths of many oysters during long hot dry summers. It has been possible to mark out areas where Dermocystidium is found and to point out natural conditions which will favor its growth and cause serious losses to planters. Biologists know that other parasitic plants and animals cause epidemics among shellfish at times.

The newly-established Microbiology-Pathology section of the Laboratory hopes to pin down other organisms involved in diseases of marine animals. Careful and rapid microtechniques are essential to these studies. With the new labor-saving Autotechnicon, the mortality research program will be greatly improved.



Salmon

KING SALMON ESCAPEMENT TO COLUMBIA RIVER SPAWNING GROUNDS GOOD:

The number of chinook or king salmon counted at Bonneville Dam on the Columbia River as they moved upstream is higher this year than by the same date last year, indicating good escapement



for the spring chinook salmon run in the river, the Director of the Washington State Department of Fisheries reported on May 5, 1960.

As of May 2, a total of 40,875 chinook had been counted over the Dam, compared to 35,000 by the same date last year. Salmon were moving over the Bonneville fishway at the rate of 5,000-6,000 a day.

The chinook catch in the commercial gill-net fishery, which opened April 30, has been generally poor. Most catches were made in the lower river, where fish are larger. Upstream catches have been less and fish are smaller, running only 10 to 15 pounds.

Early in May the river was dropping and clearing, making for good conditions for fish movement upstream. The Columbia River commercial gill-net salmon fishery, which was open until noon May 27, was conducted chiefly at night because of clear water.

* * * * *

MIGRATION STUDIES IN NORTH PACIFIC TO BE CONTINUED:

To continue studies of salmon migration on the high seas, two research vessels of the University of Washington College of Fisheries left early in April on a 5-months salmon-tagging voyage along the entire length of the Aleutian Islands from Unimak Pass to Attu.

The cruise is part of a long-range salmon migration study in the North Pa-

cific conducted by the Fisheries Research Institute of the University. Now in its fifth year, the project will be conducted with two chartered purse-seiners, the Commander and the Renown, under a \$256,000 contract with the U. S. Bureau of Commercial Fisheries.

The vast sea area centered around the Aleutian Islands is a "nursery" where many North American salmon go to mature before beginning their long journey back to their native rivers. In previous years, some of the tagged fish have been recovered in the rivers of Russia and Japan and have been found as far south as Oregon.

From a scientific standpoint, the long-term project is providing important new information on the life history of salmon. The results also will have an important effect on methods of conserving the valuable salmon runs. (University of Washington News Service, April 7, 1960.)

Note: Also see Commercial Fisheries Review, August 1957 p. 39; April 1958 p. 35; and September 1959 p. 41.



Transportation

STUDY OF EFFECTS OF NEW TRANSPORTATION EQUIPMENT ON FOOD QUALITY URGED:

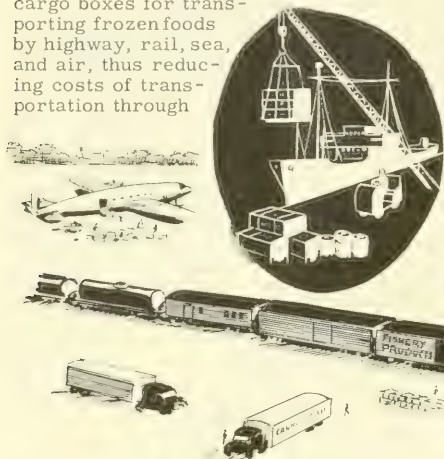
Research to determine the effect on food quality of new equipment, such as mechanically-refrigerated trucks and railroad cars and thermostatically-equipped ice-bunker cars was advised by members of the U. S. Department of Agriculture's Transportation Research and Marketing Advisory Committee at its annual meeting in Washington, February 23-25, 1960.

Shippers need to know if they can increase load size without affecting quality with the new equipment now in service, the Committee noted. It specifically recommended that researchers seek to determine the effect of improved temperature control and air circulation on product quality, and the effect of load size and pattern on temperature, air circulation, bruising, and subsequent quality.

Development of a standard method of rating refrigerator cars that would allow

railroads to specify and manufacturers to measure the ability of a refrigerated railroad car to maintain required inside temperatures was also suggested. Such a system has been recently developed and adopted by the trucking industry for motortruck trailers.

The committee also recommended development of portable refrigerated cargo boxes for transporting frozen foods by highway, rail, sea, and air, thus reducing costs of transportation through



the reduction of multiple handling of packages.

Research on the traffic-flow of trucks not regulated by the Interstate Commerce Commission that are carrying food from farms to marketplace should be expedited, according to the committee. Information is lacking on the exact scope and extent of this important movement of food in unregulated trucks.

Other important transportation research needs the committee listed are: (1) development of improved methods of loading perishable commodities on railway cars and trucks so as to reduce bruising and spoiling; (2) studies to improve protection of food against insect damage during transportation.



Tuna

ALBACORE TAGGED OFF CALIFORNIA RECAPTURED BY JAPANESE:

An albacore tagged and released off San Francisco, Calif., by biologists of the Honolulu Biological Laboratory, U. S. Bureau of Commercial Fisheries, was recaptured by Japanese tuna long-line fishermen about 1,000 miles SE. of Tokyo Bay, in the vicinity of Marcus Island. This fish was tagged by the Bureau's research vessel *Charles H. Gilbert* on November 15, 1956, and was recaptured by the long-line vessel, No. 2 *Hayatori Maru* of Iwate Prefecture, Japan, on March 13, 1960, after a period of 3 years and 4 months. This is the longest period thus far observed between tagging and recapture of an albacore.

This recapture marked the 17th recovery of albacore tagged by the Honolulu Biological Laboratory. Other recoveries in the past have also demonstrated considerable trans-Pacific

movements extending from the United States west coast to the vicinity of Tokyo Bay, indicating that there is probably a single population of this valuable tuna species in the North Pacific.

According to the Director of the Laboratory, much valuable information is obtained whenever there is a tag recovery. "Not only do we learn about migratory movements, but also about albacore age and growth. Although scientists tag the fish, we are dependent upon fishermen for the recoveries. This is an excellent example of the cooperation between fishermen and scientists, who are both interested in learning more about albacore," he said.



United States Fishing

Fleet ^{1/}Additions

MARCH 1960:

A total of 24 vessels of 5 net tons and over were issued first documents as fishing craft during March 1960--a de-

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft by Areas, March 1960

Area	March		Jan.-Mar.		Total
	1960	1959	1960	1959	
	(Number)				
New England	1	3	3	5	15
Middle Atlantic	1	3	5	3	12
Chesapeake	-	8	9	21	106
South Atlantic	4	6	14	18	76
Gulf	6	9	13	25	135
Pacific	9	-	18	8	97
Great Lakes	2	-	3	3	6
Alaska	1	-	1	2	32
Total	24	29	66	85	479

Note: Vessels assigned to the various areas on the basis of their home ports.

crease of 5 vessels as compared with the same month in 1959. The Pacific area led with 9 vessels, followed by the Gulf area with 6, the South Atlantic with 4, and the Great Lakes with 2 vessels. The New England, Middle Atlantic, and Alaska areas accounted for the remaining 3 vessels.

During the first three months of 1960, a total of 66 vessels were issued first documents as fishing craft--19 less than were reported during the same period of last year. Most of this decline occurred in the Chesapeake and Gulf areas, each of which showed a drop of 12 vessels compared with the 1959 three-months period.

^{1/}Includes both commercial and sport fishing craft.



U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, FEBRUARY 1960:

Imports of edible fresh, frozen, and processed fish and shellfish into the United States during February 1960 decreased by 23.1 percent in quantity and

17.3 percent in value as compared with January 1960. The decrease was due primarily to lower imports of frozen albacore and other tuna (down 9.8 million pounds), and to a lesser degree, a decrease in the imports of canned tuna in

United States Imports and Exports of Edible Fishery Products, February 1960 with Comparisons

Item	QUANTITY			VALUE		
	February 1960	Year 1959	February 1959	February 1960	Year 1959	Year 1959
	(Millions of Lbs.)			(Millions of \$)		
Imports:						
Fish & shellfish:						
Fresh, frozen, & processed ^{1/}	62.8	72.8	1,070.5	20.5	21.3	309.6
Exports:						
Fish & shellfish:						
Processed only ^{1/} (excluding fresh & frozen)	5.3	3.3	68.0	1.3	1.0	22.8

^{1/}Includes pastes, sauces, clam chowder and juice, and other specialties.

brine (down 2.6 million pounds), canned salmon (down 2.2 million pounds), and frozen shrimp (down 1.1 million pounds). The decrease was partly offset by increases of less than 1 million pounds in the imports of groundfish fillets, fresh and frozen salmon, and canned sardines in oil.

Compared with February 1959, the imports in February this year were down 13.7 percent in quantity and 3.8 percent in value due to lower imports of frozen tuna other than albacore (down 10.5 million pounds), and canned tuna in brine (down 1.4 million pounds). Compensating, in part, for the decreases was an increase of about 2.6 million pounds in the imports of groundfish fillets and fresh and frozen lobsters (up 0.9 million pounds).

United States exports of processed fish and shellfish in February 1960 were lower by 19.7 percent in quantity and 27.8 percent in value as compared with January 1960. Compared with the same month in 1959, the exports this February were higher by 59.1 percent in quantity and 30.0 percent in value.

* * * * *

FISH MEAL AND SCRAP IMPORTS, 1940, 1950, 1955-59:

Imports of fish meal and scrap into the United States during 1959 amounted to 132,955 short tons--an increase of 32,603 tons or 32.5 percent as compared

U. S. Imports of Fish Meal and Scrap, 1940, 1950, 1955-59						
Country of Origin	1959	1958	1957	1956	1955	1950
				(Short Tons)		1940
Canada	39,063	27,777	42,823	57,127	41,661	42,499
Peru	49,923	33,371	16,817	8,756	8,734	3,917
Chile	5,104	8,160	1,108	-	-	377
Angola	20,738	18,062	9,708	5,063	12,138	6,503
Union of South Africa	9,727	7,345	4,015	3,470	3,545	-
Norway	141	1,184	2,930	10,965	14,568	2,903
Other countries	8,259	4,453	3,795	6,030	17,357	7,656
Total	132,955	100,352	81,196	91,411	98,003	63,855
1/ Japan, 18,162 tons.						46,133

with 1958. Imports from Peru amounted to 49,923 tons and accounted for 37.5 percent of the total imports for 1959. Canada followed with 39,063 tons or 29.4 percent of the total--11,286 tons higher than the previous year.

* * * * *

U. S. IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1960 at the 12½-percent rate of duty is 53,443,330 pounds. Any imports in excess of the quota will be dutiable at 25 percent ad valorem.

Imports from January 1-April 2, 1960, amounted to 8,581,279 pounds, according to data compiled by the Bureau of Customs. From January 1-April 4, 1959, a total of 11,308,844 pounds had been imported.



U. S. Production of Fish Sticks and Portions, January-March 1960

The United States production of fish sticks during the first quarter of 1960

Table 1 - U. S. Production of Fish Sticks by Months, and Type, January-March 1960 ^{1/}			
Month	Cooked	Raw	Total
	.. (1,000 Lbs.) ..		
January	5,185	312	5,496
February	6,168	360	6,528
March	7,245	585	7,830
Total	18,597	1,257	19,854
1/ Preliminary.			

amounted to 19.9 million pounds, while the production of fish portions totaled

11.7 million pounds. This was a gain of 1.7 million pounds (9 percent) in fish sticks and 2.8 million pounds (31 percent) in fish portions as compared with the same quarter of the previous year.

Cooked fish sticks (18.6 million pounds)

Table 2 - U. S. Production of Fish Sticks by Areas, January-March 1959 and 1960				
Area	1960 ^{1/}		1959 ^{2/}	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States . .	23	16,388	24	15,070
Interior and Gulf States .	5	1,532	5	1,712
Pacific Coast States . .	7	1,934	10	1,417
Total	35	19,854	39	18,199
1/ Preliminary.				
2/ Revised.				

comprised 94 percent of the total fish stick production, while the remaining 1.3

Table 3 - U. S. Production of Fish Sticks by Months, 1956-1960					
Month	1960 ^{1/}	1959 ^{2/}	1958 ^{2/}	1957	1956
	.. (1,000 Lbs.) ..				
January	5,496	6,265	5,471	4,261	4,862
February	6,528	6,340	5,925	5,246	5,323
March	7,830	5,594	5,526	5,147	6,082
April	-	4,708	4,855	4,492	3,771
May	-	4,398	4,229	3,380	3,873
June	-	4,575	4,702	3,522	3,580
July	-	3,783	4,574	3,821	3,153
August	-	3,872	4,358	4,643	4,166
September	-	5,343	5,328	4,861	4,085
October	-	5,831	5,485	5,162	5,063
November	-	4,822	5,091	4,579	4,585
December	-	4,734	5,467	4,014	4,019
Total	-	60,265	61,011	53,128	52,562
1/ Preliminary.					
2/ Revised.					

million pounds (6 percent) consisted of raw fish sticks. A total of 11.3 million

Table 4 - U. S. Production of Fish Portions by Months and Type, January-March, 1960 ^{1/}				
Month	Breaded		Unbreaded	Total
	Cooked	Raw		
	.. (1,000 Lbs.) ..			
January	466	3,040	3,506	117
February	549	2,786	3,335	119
March	874	3,589	4,463	156
Total	1,889	9,415	11,304	392
1/ Preliminary.				

pounds of breaded fish portions (of which 9.4 million pounds were raw) and nearly 0.4 million pounds of unbreaded portions was processed during the first quarter of 1960.

The Atlantic Coast was the principal area in the production of both fish sticks

Table 5 - U. S. Production of Fish Portions by Areas, January-March 1959 and 1960

Area	1960 ^{1/}		1959 ^{2/}	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States . .	21	6,839	19	5,405
Interior, Gulf, and Pacific Coast States . .	12	4,857	9	3,537
Total	33	11,696	28	8,942

1/ Preliminary.

2/ Revised.

and portions with 16.4 million and 6.8 million pounds, respectively. The remaining 3.5 million pounds of fish

Table 6 - U. S. Production of Fish Portions by Months, 1958-1960

Month	1960 ^{1/}	1959 ^{2/}	1958
		(1,000 Lbs.)	
January	3,623	2,692	1,973
February	3,454	3,025	1,254
March	4,619	3,225	1,471
April	-	2,634	2,268
May	-	2,684	1,478
June	-	3,247	1,504
August	-	2,227	2,161
September	-	2,796	1,516
October	-	4,314	2,560
November	-	3,483	1,979
December	-	3,262	2,060
Total	-	37,147	21,790

1/ Preliminary.

2/ Revised.

sticks and 4.9 million pounds of fish portions were packed in inland, Gulf, and Pacific Coast States.

Note: See Commercial Fisheries Review, March 1960 p. 33.



Wholesale Prices, April 1960

The April 1960 wholesale price index for edible fishery products (fresh, frozen, and canned) at 123.3 of the 1947-49 average was about unchanged from the preceding month. Price changes from March to April were sharp for some items, but the changes up or down just about counterbalanced each other. From April a year ago to this April the overall wholesale fishery products price index increased by about 0.5 percent, due primarily to higher canned fish and shucked oyster prices.

Haddock landings at New England ports were about at an annual peak this April and contributed to another sharp drop (48.0 percent) in the mid-month price for fresh large drawn haddock. Higher wholesale prices for the other six items in the drawn, dressed, and whole finfish subgroup failed to offset the lower haddock price and the subgroup index dropped 2.8 percent from March to April this year. The Jewish holidays resulted in some sharp increases in wholesale prices for fresh-water fish from March to April 1960. The drawn,

dressed, or whole finfish subgroup index for April this year as compared with the same month a year ago was up 1.7 percent. Mid-April 1960 large haddock prices were down about 20 percent and frozen dressed halibut prices were down 9.1 percent as compared with the same month a year ago. These



South side of Boston fish pier with otter trawlers tied up at the dock. Note loaded fish carts and rear entrances to the wholesaler dealers' stores.

sharp declines were more than offset by a 40.8-percent increase in fresh yellow pike prices and a 4.6-percent increase in frozen dressed salmon prices.

Fresh processed fish and shellfish in April 1960 declined 3.6 percent from the preceding month due primarily to a 20.3-percent drop in fresh haddock fillet prices. In addition, both fresh shrimp and shucked oyster prices were down slightly. From April a year ago to this April the processed fresh fish and shellfish subgroup wholesale price index was higher by a fraction of one percent. Higher shucked oyster prices (up 15.2 percent) more than compensated for a drop of 10.3 percent in fresh shrimp prices and a decline of 3.5 percent in fresh haddock fillet prices.

The wholesale price index for processed frozen fish and shellfish in April this year was higher than the preceding month by 6.5 percent because of an increase in the wholesale price for frozen shrimp at Chicago. The sharp jump of about 11 cents a pound from mid-March to mid-April reflected the rapid decline in frozen shrimp inventories and a shortage in some of the larger sizes. In April 1960, the drop of 5.3 percent in the frozen haddock fillet price continued to reflect the weak market for this product which has been apparent for several months. The processed frozen fish and shellfish subgroup index this April as compared with April a year ago dropped 9.4 percent. All subgroup items were lower in April this year as compared with April a year ago. Frozen shrimp prices, although much firmer in April this year, were still 7.9 percent below April 1959 prices. During the same period frozen haddock fillet prices declined by 23.9 percent, frozen flounder fillets were lower by 3.8 percent, and frozen ocean perch fillets were down 1.7 percent.

The primary wholesale price index for canned fish products in April this year increased 1.0 percent from the preceding month due to the first increase in canned light meat tuna prices in almost a year. As of mid-April this year canned tuna inventories were in a healthy condition and supplies of raw tuna for canning were lower than for the same period of 1959. Compared with April 1959, primary wholesale prices for canned fish this April were higher by 5.9 percent. Prices for all canned fish items in the subgroup were higher in April this year for April a year ago. The fishing season for Maine sardines opened on April 15, but stocks of canning size herring were not expected to be available before late May or early June. Stocks of canned tuna in April 1960 were still good and Maine sardine stocks were about sufficient to last until the new season gets under way. Supplies of canned California sardines in 15-oz. cans and all packs of canned salmon were down practically to zero in April this year.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, April 1960 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ (\$)		Indexes (1947-49=100)			
			Apr. 1960	Mar. 1960	Apr. 1960	Mar. 1960	Feb. 1960	Apr. 1959
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					123.3	123.1	121.8	122.7
Fresh & Frozen Fishery Products:					136.7	137.6	134.9	139.6
Drawn, Dressed, or Whole Finfish:					144.3	143.5	147.2	141.9
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.60	.12	60.8	116.9	120.9	76.0
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.30	.29	92.8	90.3	90.3	102.1
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.30	.78	179.2	174.7	172.5	171.3
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.98	.79	241.7	195.8	185.9	241.7
Whitefish, L. Erie pound or pill net, rnd., fresh	New York	lb.	1.05	.72	212.5	144.7	136.6	217.4
Yellow pike, L. Michigan & Huron, rnd., fresh .	New York	lb.	1.00	.78	234.5	181.8	170.0	166.5
Processed, Fresh (Fish & Shellfish):					137.1	142.2	134.5	136.5
Filets, haddock, sml., skins on, 20-lb. tins . .	Boston	lb.	.38	.35	93.0	117.4	139.5	97.0
Shrimp, lge. (26-30 count), headless, fresh . .	New York	lb.	.78	.81	123.2	127.2	112.2	137.4
Oysters, shucked, standards	Norfolk	gal.	6.63	9.75	164.0	167.0	163.9	142.3
Processed, Frozen, (Fish & Shellfish):					116.2	109.1	110.2	123.3
Filets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.38	.38	99.5	98.1	98.1	103.4
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.27	.29	84.8	89.5	97.3	111.4
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.29	.29	116.8	114.8	110.8	118.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.77	.68	118.0	104.5	104.1	123.1
Canned Fishery Products:					104.8	103.8	103.8	99.0
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs. . .	Seattle	cs.	24.50	24.50	127.8	127.8	127.8	117.4
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.10	10.89	80.0	77.9	77.9	79.3
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	8.00	8.00	93.9	93.9	93.9	82.2
Sardines, Maine, keyless oil, No. 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.75	8.75	93.1	93.1	93.1	87.5

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.



ECOLOGY OF SHRIMP STUDIED

Research on a typical nursery area is being continued by the Galveston Biological Laboratory of the U. S. Bureau of Commercial Fisheries. This work shows promise of defining the complex ecology of the shrimp nursery grounds and will show when the brown and white shrimp larvae arrive from the sea and then depart to the offshore waters as the season progresses. The Laboratory staff will try to determine the physiology, tolerance, and response of shrimp to various conditions and their nutritional requirements.



International

FOOD AND AGRICULTURE ORGANIZATION

EUROPEAN NATIONS TO DISCUSS INLAND FISHERIES:

An organization designed for discussion and combined action on common problems of European inland fisheries held its first meeting April 25-30, 1960, at Dublin, Ireland. Among the problems are prevention of water pollution, control of aquatic weeds and fertilization of fish ponds, and removal of predatory fish. The new group is known as the European Inland Fisheries Advisory Commission (EIFAC) and is sponsored by the Food and Agriculture Organization (FAO).

All European members of FAO had been invited to the meeting as participants or as observers, and 14 countries had already signified their desire to become commission members. Five international organizations, involved in work related to fisheries, had been invited to attend as observers.

The new commission resulted from a meeting of an intergovernmental group of inland fisheries experts in Helsinki, Finland, in 1956. This group recommended that FAO establish an organization to meet the specific needs of European inland fisheries services.

"Although European fish culture has already reached a high degree of development," said the Chief of the Inland Resources Section, Fisheries Division, FAO, "the pooling of research methods and techniques should increase food production far beyond that achieved by traditional means."

At its first meeting the Commission was expected to establish its rules of procedure and to set up its internal structure.

LAW OF THE SEA

DEVELOPMENTS AT GENEVA CONFERENCE:

April 6-11: The Second Law of the Sea Conference sponsored by the United Nations convened at Geneva on March 17, 1960, with representatives of 87 nations on hand to arrive at some understanding on the territorial sea and fishing rights. It appears that there are many nations anxious to reach some kind of agreement.

Although representatives of various nations were still scheduled to make speeches on the various "positions" of their respective countries, as of April 6 four principal proposals had been made in the Committee of the Whole:

- (1) **U.S.S.R.:** Territorial sea up to 12 miles; if less than 12 miles territorial sea is chosen by a nation, the balance up to 12 is exclusive fishing zone for the coastal state. Means a fishing limit of 12 miles for the coastal state.
- (2) **Mexico:** (a) Territorial sea from 3 to 6 miles; exclusive fishing zone up to a limit of 18 miles. (b) Territorial sea 7 to 9 miles; exclusive fishing zone up to a limit of 15 miles.
- (3) **United States:** Territorial sea 6 miles; historic fishing between 6 and 12 miles may be continued, for same groups of species, based on five-year average.
- (4) **Canada:** Territorial sea 6 miles; exclusive fishing zone between 6 and 12 miles.

Ghana on April 4 made an attempt to resolve a deadlock in the Conference by offering a compromise between United States and Canadian proposals on offshore fishing limits. Although some United States delegates regarded the proposal as "perhaps the best the United States can get," others insisted that the United States should attempt to obtain a phase out of historic fishing rights. A time limit on withdrawal of fishing operations beyond the historic three-mile limit would result if the Ghana proposal prevails. The Ghana spokesman pointed out: "Complete exclusion of foreign fishermen could cause human and economic hardships. However, the United States proposal for fishing rights in perpetuity is defective.

"There should be a limit in point of time—a period of readjustment to allow foreign fishermen time to find other fishing grounds or make adjustments in their economy. It also would give coastal states time to develop their fishing potential for maximum sustainable yield."

On April 4 the Chairman of the United States delegation at the Conference indicated that the United States has no choice but to show some flexibility on fishing rights. On April 5 the Chairman confirmed reports that a high-level meeting was planned by the Canadian and United States delegations at the Conference to work out a joint proposal to offer the Conference.

The Ceylon spokesman on April 5 suggested modification of the Canadian proposal to cover later bilateral agreements with the United States. This, in effect, would put Canada on record to give ground on historic fishing rights.

On April 6 it was reported that the principal Western maritime nations had worked out a compromise on fishing rights. The compromise will be between the proposals of the United States and Canada for a six-mile territorial sea, with a contiguous six-mile fishing zone. Canada advocated the exclusion of foreign trawlers while the United States reserved

International (Contd.):

limited rights for foreign fishermen who regularly fished the waters concerned. The compromise proposes that coastal states receive exclusive fishing rights in a six-mile zone adjoining their territorial sea after a ten-year waiting period. The United Kingdom also is reported to support this compromise.

April 12-22: On the first day of voting at the Conference, April 13, 1960, the joint United States-Canadian compromise proposal received a plurality of the votes cast in the Committee of the Whole, 43 to 33, with 12 abstentions. This fell short of the two-thirds majority required for final adoption. The abstaining countries were Argentina, Belgium, Cambodia, Cuba, Finland, France, Ghana, Guatemala, Holy See, India, Philippines, and Sweden. It was expected that a number of these countries would later switch their votes in favor of the joint proposal.

Mexico and Venezuela joined the 16 Afro-Asian nations in a revised proposal, in favor of which the Soviet proposal was finally withdrawn. The revised Afro-Asian proposal was narrowly beaten, 36 to 39, with 13 abstentions. As of April 13, therefore, only the joint United States-Canadian proposal and an Icelandic proposal were approved by the Committee and referred to the plenary. More than half the Conference abstained from voting on the Icelandic proposal.

The 12-mile Russian-backed proposal was defeated in the Committee of the Whole, where it secured 44 percent of the total votes. There was therefore reason to hope that a number of countries would then be able to change their votes in favor of the joint United States-Canadian proposal so that in the plenary session it would gain the 59 votes required for all delegations were present and voting. If there were abstentions, correspondingly fewer votes would be required. The plenary was scheduled to convene on April 19.

On April 8, Ambassador Dean addressed the Conference in behalf of the joint United States-Canadian compromise proposal. He stated that it clearly would satisfy both the needs and future aspirations of coastal states, while at the same time it would protect foreign fishing interests from unnecessary or precipitate injury; therefore, he asserted, it is the only proposal acceptable to enough nations for adoption by the Conference. He emphasized the two concessions which the United States is making—placing a time limitation on foreign fishing rights, and making the limit 10 years; the proposal thus goes more than halfway to meet the objections of other countries. He thanked individually the many delegates who had given him cooperation and understanding, and he reiterated that the unusual situations of certain other countries that are overwhelmingly dependent upon their fisheries within the 12-mile zone must be given careful and sympathetic consideration. The many complex and varying problems of basic fishing rights in the fisheries zone will need, he continued, to be implemented by bilateral or multilateral arrangements consistent with the basic principles now established, so that the principles may be applied in an orderly and practical manner. With this proposal an important new principle concerning fishing jurisdiction is to be embodied in international law. Finally, Ambassador Dean took advantage of the occasion to note that the Four Convention and General Protocol which had been approved at the 1958 Conference had just been favorably reported to the United States Senate; this, he hoped, augured well for the success of the present Conference.

The first of several proposals to be submitted at Geneva during the fourth week of the Conference was put forward by Iceland on April 7, and revised on April 12. The revision provides that where a people is overwhelmingly dependent upon its coastal fisheries for its livelihood or economic development and it becomes necessary to limit the total catch in areas adjacent to the coastal fisheries zone, the nation shall have preferential rights under such limitations to the extent rendered necessary by its dependence on fishery. On April 13, the Committee of the Whole approved it for further action by a vote of 31 to 11, with 46 abstentions.

A revised version of the 16-nation Afro-Asian proposal, previously mentioned, was presented on April 10 by the original sponsors, now increased to 18 by the addition of Mexico and Venezuela. The revision provided that every country should enact the laws and regulations necessary to prevent its nationals from fishing in the territorial sea and in fishery zones of other countries unless especially authorized to do so. It was voted down on April 13, as above.

The Philippine amendment, previously mentioned, had been withdrawn on April 12. On April 13, the Cuban delegate proposed an additional protocol to the Convention on Fishing and Conservation of the Living Resources of the High Seas whereby a coastal state might unilaterally limit the catch in special circumstances. Argentina on April 11 and Guatemala on April 12 submitted amendments to the United States-Canadian compromise proposal, but they were voted down on April 13. Thereupon the Guatemalan delegate proposed to have the United States-Canadian measure voted on, paragraph by paragraph. Ambassador Dean made it quite clear, however, that the joint proposal was an integrated whole, and must be so voted on. This Guatemalan proposal was also defeated. Peru offered a resolution which provided that a country might, in an exceptional situation and in certain conditions, establish unilaterally the extent of the area of its jurisdiction in which it would apply fishery-conservation and control measures.

The 88-nation Law of the Sea Conference decided on April 20 to put off until April 26 the final voting on the twin issues of the width of the territorial sea and fishing rights. The five-week-old Conference, as of April 20, was scheduled to finish its work by April 22, but the lack of speakers has delayed final action in the plenary sessions which began April 19. The only formal proposal before the Conference as of April 20 was the joint United States-Canadian plan for a six-mile limit for the territorial sea coupled with a further six-mile fishing limit for the coastal state. All foreign fishing vessels would be barred from fishing within 12 miles of the territorial waters of a coastal state beginning in 1970.

On April 22 Sweden told the Conference that it would vote for the United States-Canadian proposal the week of April 24. The delegate from Sweden told the Conference he previously abstained from voting for the United States-Canadian proposal because Sweden is opposed to the idea of exclusive coastal fishing rights beyond the territorial sea. But he said Sweden would support the proposal "to help the Conference to arrive at a positive result and prevent anarchy along the world's coasts."

WHALING

ANTARCTIC SPERM WHALE OIL PRODUCTION LOWER FOR 1959/60 SEASON:

Sperm whaling prior to the December 28, 1959, opening of the regular 1959/60 Antarctic season yielded 18,414 short tons of oil, excluding production of the Soviet Union for which no data are available. Comparable production last season was 34,563 tons, nearly twice as much.

Whaling expeditions normally arrive in the Antarctic prior to the opening of the regular season set by the International Whaling Convention and conduct sperm whaling operations until the regular season opens. Sperm whaling, not controlled by the Convention, virtually ceases when the season opens.

Antarctic Sperm Whale Oil Production, 1958/59 and 1959/60		
Country	1959/60	1958/59
	(Short Tons)	
Norway (8 expeditions, 9 last season).	5,842	10,341
Japan (6 expeditions)	11,480	17,889
United Kingdom (3 expeditions) . . .	1,092	4,761
Netherlands (1 expedition)	0	2,571
Total	18,414	34,562

International (Contd.):

Sperm oil production in the Antarctic usually accounts for 40 to 50 percent of the annual world production and most of the variation in total world production. Sperm oil output outside the Antarctic has increased slightly in recent years, the U. S. Department of Agriculture reported in its March 28, 1960, issue of Foreign Crops and Markets.

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ANTARCTIC WHALE OIL PRODUCTION LOWER FOR 1959/60 SEASON:

According to information from the International Association of Whaling Companies, Sandefjord, Norway, all countries participating in the Antarctic 1959/60 whaling season had ceased operations by April 7, 1960, with the exception of the Netherlands expedition. The catch in terms of blue-whale units amounted to 15,437 units. This amount exceeds the over-all catch quota in effect during the 1958/59 season, but was well below the predicted catch of 17,000-18,000 units. The quota established by the International Whaling Commission for the current season was inoperative because both Norway and the Netherlands were operating outside of the convention for the first time.

1957/58. (United States Embassy in Oslo, April 12, 1960.)



British Honduras

FISHERY PRODUCTS EXPORTS, 1958-59:

British Honduras exports of fishery products during 1959 totaled 523,249 pounds, valued at US\$187,607, as compared with a total of 352,196 pounds, valued at US\$153,698, in 1958.

British Honduras Exports of Fishery Products, 1958/59 (Total Exports & Exports to United States)					
Product	1959		1958		
	Quantity Lbs.	Value US\$	Quantity Lbs.	Value US\$	
Fresh, frozen, or live fish:					
Total exports	80,479	12,737	53,377	6,701	
Exports to U. S.	49,680	9,482	26,608	3,764	
Salted, dried fish, etc.:					
Total exports	32,638	3,192	58,208	6,108	
Exports to U. S.	-	-	-	-	
Spiny lobster, whole and tails:					
Total exports	398,043	167,685	369,028	157,760	
Exports to U. S.	368,920	162,411	324,768	149,740	
Tortoise shell:					
Total exports	1,507	3,101	696	1,844	
Exports to U. S.	-	-	-	-	
Unclassified:					
Total exports	10,582	892	12,070	1,099	
Exports to U. S.	400	182	820	194	
Total all fishery products:					
Total exports	523,249	187,607	493,379	173,512	
Exports to U. S.	418,000	172,075	352,196	153,698	

Exports of fish and shellfish to the United States from British Honduras in 1959 accounted for 80.1 percent of the volume and 91.7 percent of the value.

Antarctic Whale Oil Production^{1/}, 1957/58-1959/60

Country	Catch	Oil Production			
	1959/60	1959/60	1959/60	1958/59	1957/58
	Blue-Whale				
	Units	Bbls.	... (1,000 Short Tons) ...		
Norway	4,565	588,450	110	148	153
United Kingdom . . .	1,898	234,420	44	46	60
Japan	5,217	551,265	103	115	109
Netherlands	2/ 968	2/ 125,452	23	24	21
U. S. S. R.	2,789	NA	NA	NA	NA
Total	15,437	3/ 1,499,587	3/ 280	3/ 333	3/ 343

^{1/} Preliminary data.

^{2/} Netherlands still operating after the Whaling Commission closing date of April 7. Data for Netherlands are as of March 26.

^{3/} Exclusive of U. S. S. R. production.

NA - not available.

Preliminary statistics for 1959/60 indicate whale oil production of 280,000 short tons, a drop of about 15.9 percent from the 333,000 tons produced in the 1958/59 season and a drop of 18.4 percent from the 343,000 tons produced in

There was an increase of 19.0 percent in volume and 12.0 percent in value as compared with 1958.



Canada

BIOLOGISTS SURVEY ARCTIC FISHERY RESOURCES:

With the development of fishery projects in the Canadian Arctic area becoming more concentrated in recent years, fishery biologists are increasing their efforts to discover basic yet vital information on fish stocks of the many water systems throughout that vast area. For countless generations, Eskimos have fished those lakes on a subsistence basis, supplementing their hunting excursions in search of food. In recent years both commercial and sports fishing enterprises have been established in the Canadian north. Science has benefited fishing operations in other parts of Canada, and a project conducted in 1959 by the Arctic Unit of the Fisheries Research Board of Canada will undoubtedly be of great value to Federal fishery officials, the Department of Northern Affairs and National Resources, and those concerned with fishing operations in the Arctic.

The Arctic Unit, which is based in Montreal, has made a survey of fish stocks of the Mackenzie and Keewatin Districts. This survey covered some 21 lakes extending east from Great Bear Lake to the northwest coast of Hudson Bay. The unit's base of operations was located at Yellowknife, Northwest Territories. From that base 4 field parties were transported by air to spend nearly 2 weeks on each lake. The lakes were carefully selected to represent many watersheds including those drained by the Coppermine, Back, Thelon, and Dubawnt Rivers.

The biologists amassed a prodigious amount of data during their investigations in the "land of the midnight sun," and considerable time will be required before a complete analysis can be made.

The common whitefish and lake trout were the dominant species in all water areas studied, followed by round whitefish, pike, cisco, and grayling. The distribution of arctic char was limited to waters draining directly into the Arctic Ocean.

The Research Board made special arrangements with the Institute of Fisheries of the University of British Columbia, and with the Division of Fishes of the Royal Ontario Museum, for the participation in the survey of senior biologists from those institutions. Both the University and the Museum are now identifying the fish taken from the area during the survey.

In addition to information gathered on the fish of the area, the biologists collected a variety of associated material for other organizations and specialists in the many different fields of biology. (Canadian Trade News, January 1960.)



Costa Rica

FISHERIES TRENDS, APRIL 1960:

A meeting was held at Puntarenas, Costa Rica, on April 3, 1960, between officials of the Chamber of Fishermen of Puntarenas, the Minister of Economy and Finance, and other government and banking officials.

The Chamber made known the economic difficulties which the fishing industry has been encountering owing to a lack of financial support from Costa Rican sectors. They reported that their operations heretofore have been financed almost exclusively by United States investors who, according to a press report, "have reaped fabulous profits at the expense of Costa Rican fishermen."

The possibility of establishing a fishmeal plant on a cooperative basis, and eventually a fish canning operation, was discussed.

The Minister of Economy and Finance offered a concession in the form of an increase in the proportion (from 65 to 99 percent) of the foreign exchange that could be authorized from fish products exports, at the legal free rate (CR\$1.00 equals US\$0.1504). It was also proposed to facilitate the granting of bank loans to the fishermen. For this purpose, the utilization of some CR\$2,000,000

Costa Rica (Contd.):

(US\$300,800 at free rate) from a pending bank loan might be considered.

Another matter discussed at the meeting which appears significant, in view of the United States Export Promotion Program, was the possibility of purchasing a large shrimp boat, at a cost of approximately US\$75,000 which could be operated on a cooperative basis. (United States Embassy in San Jose, April 5, 1960.)

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SHRIMP INDUSTRY TRENDS, 1959:

Costa Rica's shrimp landings in 1959, were 1,356,300 pounds (1,095,700 pounds of large and 260,600 pounds of small shrimp). These data appeared in an article in La Nación of March 23, 1960. The newspaper reported that the Fish and Wildlife Section of the Ministry of Agriculture had completed a thorough statistical study of the production of fish and shrimp at Limon and Puntarenas.

It had been estimated that in a good year production could reach 1,500,000 pounds. Shrimp landings in 1959 were the highest in Costa Rica's history. In 1958, landings were only 930,000 pounds.

As of March 1960 there were 43 motorized fishing vessels at Puntarenas engaged exclusively in the fishing of shrimp, representing an investment in excess of CR\$6 million (US\$905,000). As a part of this industry there also are three refrigeration plants and two packing houses which represent a financial investment in excess of CR\$2 million (US\$302,000). The fishing industry of Costa Rica maintains no less than 600 families whose chief source of income is derived from fishing for shrimp or from the shrimp-processing plants. (Report of March 23 of United States Embassy, San Jose.)

Notes: (1) Values converted at rate of CR\$6.63 equals US\$1.

(2) Also see Commercial Fisheries Review, March 1960, p. 44.



Cuba

FISHERIES TRENDS, MARCH 1960:

During the eighth meeting in Havana of the National Institute for Agrarian Reform held in March 1960, the Executive Director reported on "the achievements" of the organization for the ten months of its operation. In the field of fisheries he reported the following: 38 fishing and 6 frog cooperatives have been formed; 6 dockyards have been constructed, of which 5 are in full operation; 6 packing and freezing plants are controlled by the Institute; and it operates a cannery which has been taken over from the Ministry of Misapplied Goods.

The Department of Fisheries now controls the prices and the distribution of fish, including exports of frozen fish. (United States Embassy in Habana, March 21, 1960.)

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CLOSED SEASON ON SHRIMP TRAWLING AND SEVERAL SPECIES OF FISH:

The Cuban Instituto Nacional de la Pesca (INP) by a Resolution published in the Official Gazette No. 63 of March 31, 1960, imposed a closed season on the capture of the species biajaca (tripletail), joturo, dajao and mojarra (perch), effective during the period April 10 through July 1, 1960, inclusive.

The INP, in the same Official Gazette, issued another Resolution which prohibited April 1-30, 1960, the capture of shrimp by trawl nets in that portion of the southern shelf east of meridian 77°24' west longitude, which passes through the Santa Clara Shoal. Previously the capture of shrimp by trawl nets had been prohibited in the southern shelf east of meridian 77°24' west longitude, which passes through the extreme eastern portion of the Chinchorro Shoal.

Previously on March 23, a circular (No. 89) was issued by the Cuban Customs Office which announced that the Fisheries Division of the INRA (Agrarian Reform Institute) declared a closed season on the capture of sea shrimp ("camaron de mar") April 1 to April 30, 1960, both dates inclusive.

Cuba (Contd.):

Five days after the closed season became effective, it was forbidden to transport, sell, or store live or frozen shrimp. (United States Embassy in Habana, April 6, 1960.)



Denmark

HERRING MEAL EXPORTS THREATENED:

Denmark's export of herring and other fish meals is in serious jeopardy because of lower-price, higher-quality fish meals coming from Peru, states a Danish newspaper *Kristelig Dagblad* (Independent Daily). The paper cites the Ministry of Fisheries as saying that Peru has driven Denmark completely out of the United States and French markets, and that sales to the United Kingdom have been reduced by 50 percent, all since the beginning of 1960. (United States Embassy in Copenhagen, April 1, 1960.)



Ecuador

EXCHANGE REGULATIONS MODERATED ON SHRIMP EXPORTS:

The Ecuadoran Monetary Board Resolution 352 eased existing exchange regulations on shrimp exports with a view to promoting exports. Shrimp exporters now are required to turn in only the first US\$100 per metric ton of the f.o.b. price received to the Central Bank at the official rate (Sucre 15 per US\$1.00). Heretofore, shrimp exporters were required to turn in the first US\$300 per metric ton of the f.o.b. price received.

The Board's action reflects not only interest in expanding exports but the country's ability to grant free exchange privileges to exporters in increasing degree. Exports of shrimp have been increasing sharply and were valued at close to US\$4 million f.o.b. in 1959. Ecuador has expressed keen interest in the reported consideration by the United States Congress of restricting foreign

shrimp imports. (U. S. Embassy in Quito, April 8, 1960.)



French Polynesia

DEVELOPMENT OF FISHING INDUSTRY UNDER CONSIDERATION:

Fishing, while traditionally important in French Polynesia, is still primarily conducted to supply the local demand for fresh fish. The Government would like to place it on an industrial basis, both in order to augment local food resources and to create an additional export industry. During 1959, an expert from Paris on fishing and fish preservation, conducted a study in the Territory, and his recommendations for the establishment of this industry are due. At present the local population is suspicious of frozen fish, but at the same time likes canned fish. Thus when catches are good, prices in Papeete are very low, but otherwise they tend to be abnormally high and imports of canned fish are required.

As indicated, the Government hopes soon to eliminate the paradox presented by the importation of canned fish into this island territory which abounds with fish. The Administration intends to participate in the establishment of a large-scale fishing industry and the installation of facilities for fish processing and the manufacture of byproducts. (United States Consulate in Suva, March 10, 1960.)



French West Africa

TUNA FISHERY:

An important conference on Senegal's tuna fishing and canning industries in Dakar was held in Dakar on January 29-30, 1960. It was attended by several Senegalese Ministers and high officials, delegates from the French government and fishing interests as well as local canners. They discussed the problems pertaining to the development of the tuna resource, 16,000 metric tons of which are expected to be obtained this season. They believe, with some justification, that annual production could reach 50,000

French West Africa (Contd.):

tons in a few years, the greater part of which would be exported canned or frozen outside the franc area.

A new tuna cannery built in two months by the Societe des Pecheurs de France began operating on January 30, 1960. It can process 40 tons of fish a day, the United States Consul at Dakar reported on March 7, 1960.



Honduras

RESTRICTIONS ON SHRIMP FISHING TEMPORARILY SUSPENDED:

Shrimp fishing operations off the Bay Islands of Honduras came to a virtual halt during the summer months of 1959 when the National Congress approved a fishing law which limited fishing activities by foreigners except for sport, scientific purposes, or personal consumption. In the event the catch is to be used for "exploitation or profit," the law declared that "only resident Hondurans and Honduran corporations, at least 51 percent of whose capital belongs to Honduras, may obtain permits or licenses to fish."

However, the Minister of Natural Resources was subsequently given authority to grant temporary permits, since the Executive Branch hoped that the Congress would reconsider the fishing law and approve a version which would be more favorable for the development of the fishing resources of the country. As of March 28, 1960, the Congress had failed to act, according to a dispatch of the same date from the United States Embassy in Tegucigalpa.



Iceland

BRITISH FISHING VESSELS LEAVE FISHING BANKS OFF ICELAND:

On March 14, 1960, all British trawlers and accompanying naval escorts left Iceland's 12-mile fishing waters at the height of an unusually good season. The press estimated that shortly before the withdrawal ordered by the Association of

British Trawler Owners for the Law of the Sea Conference period, 40 to 50 British trawlers were fishing in the waters near Iceland. The press also noted that this was the first time in 80 years that the Icelandic fishing banks were free of British fishing boats.

Since September 1, 1958, when Iceland unilaterally declared jurisdiction over the fisheries out to 12 miles, 273 United Kingdom fishing vessels have been reported fishing inside the 12-mile limit off the Icelandic coast. (Report of March 18 from United States Embassy, Reykjavik.)

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COMPETITION FOR FISH STOCKS CAUSES CONCERN:

The increasing competition for available fish stocks is causing concern in Iceland's fishing industry. The Social Democratic newspaper early in April again reminded its readers that this competition, particularly from the Soviet Union, becomes more serious each day. It cited the Soviet goal of self-sufficiency in fish by 1965. As a means of meeting increasing competition, the newspaper stated, Iceland must guarantee high-quality fish and must seek markets all over the world. (U. S. Embassy report from Reykjavik, April 20, 1960.)

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DISAGREEMENT ON EX-VESSEL FISH PRICES:

The National Federation of Icelandic Fisheries Owners and the Freezing Plants Corporation in mid-March could not agree on ex-vessel prices for fish. This dispute between the fishermen and motorboat owners is over a higher amount demanded by the fishermen for each kilogram of fish caught than the freezing plants are willing to grant.

On March 21, the vessel owners still unable to reach agreement with the fish-freezing plants on the price of cod and haddock, unilaterally announced an ex-vessel price of Ikr. 2.65 per kilogram (about 3.16 U. S. cents a pound at rate of 38 kronur equal US\$1) for net fish.

The freezing plants had been offering a much lower price which averaged Ikr.

Iceland (Contd.):

2.20 per kilogram (about 2.63 U. S. cents a pound).

This disagreement over fish prices is something which occurs each year. This season, however, there is added Government determination that wages shall not rise. (March 18 and 24, 1960, reports from the United States Embassy, Reykjavik.)

EVENTS AT LAW OF THE SEA CONFERENCE FOLLOWED CLOSELY:

Interest in the Law of the Sea Conference in Geneva, at which Iceland is represented by a relatively powerful delegation made up of members of all four Althing parties, continued to run high during the latter part of March 1960. The press gave daily front page attention to the proceedings, and continued to reflect unqualified unanimity behind Iceland's position. The newspaper Morgunbladid (Independence Party) probably spoke the national sentiment when it characterized the conference as of "overriding importance insofar as Iceland's economy and independence are concerned." Public support of the Canadian position appeared to be undivided. On the other hand, a Morgunbladid headline declared, "The United States' Proposal Is Still the Most Dangerous One for Iceland." The newspaper Visir (Independence Party) stated emphatically that Iceland's future aim must be the whole continental shelf.

FISH FARMING PROJECT PROPOSED:

An Icelandic citizen is planning a fish-farming project to raise principally sea trout (*Salmo trutta trutta*) for export. He has acquired a tract of land on the Snaefells Peninsula (in Western Iceland) adjoining a bay, and by damming up an arm of the bay he expects to create a large fish pond of 20,000 to 25,000 square meters (23,920-29,000 square yards). In one section he plans to hatch the trout eggs in fresh water, and then raise them in the brackish water section. He plans to feed the fish by placing fish waste from fish processing plants in the

water as food for plankton, which in turn would nourish the sea trout. This method of culture has been verified by a Professor in the Fisheries Department, University of Washington, Seattle, who visited Iceland in 1959.

By raising and exporting principally sea trout, the University of Iceland Research Council has estimated that the project could gross Ikr. 3 million (US\$79,000) annually. The Parliament has under consideration an appropriation request for Ikr. 750,000 (US\$20,000) to get this project started. The export of the frozen sea trout to France, other West European markets, and to the United States is planned. The Icelandic citizen has formulated his plans with the Fisheries Department and the Director of the Fresh Water Fisheries. (United States Embassy in Reykjavik, April 7, 1960.)

FISHERY LANDINGS, 1957-59:

Icelandic fishery landings during 1959 were 11.8 percent higher than in 1958 and 29.4 percent higher than during 1957. Cod and ocean perch landings were down, but landings of herring and flounder were up in 1959 as compared with 1958. (Aegir, February 15, 1959.)

Icelandic Landings/ by Species, 1957-59			
Species	1959	1958	1957
..... (Metric Tons)			
Flounder:			
Plaice	875	569	1,320
Lemon sole	231	157	1,157
Megrim	640	364	143
Witch	157	160	100
Dab	34	23	1
Halibut	1,048	844	914
Skate	653	731	209
Cod	232,052	235,448	201,160
Haddock	18,705	18,753	20,083
Ling	2,211	3,304	2,684
Wolfish (catfish)	8,745	9,547	8,824
Ocean perch (redfish)	99,329	109,920	61,552
Saithe	12,008	11,891	14,376
Cusk	3,032	4,615	3,386
Herring	182,887	107,318	117,495
Other	1,800	1,394	2,923
Total	564,407	505,038	436,327
1/Except for herring which are landed round, all fish are landed drawn.			

MANPOWER SHORTAGE FELT BY FISHING FLEET:

The Icelandic fishing fleet continues to receive new fishing vessels at a high

Iceland (Contd.):

rate. This points up the problem as to whether enough manpower is available in Iceland itself to man the fleet.

Only a few Faroese crew members have gone to Iceland to work, despite the recent lifting of a ban on working on Icelandic vessels by the Faroese Fishermen's Union. The press reported on March 17 that some British and Polish seamen had signed-on to man Icelandic fishing vessels.

Although a trickle of manpower is coming in from the outside, there is no doubt that it will fail to make up for the normal influx of about 800 Faroese seamen which usually takes place in the spring. This was despite reported unemployment in the Faroe Islands and an unusually good spring cod season for the Icelanders. A number of Icelandic trawlers continued to tie-up at the dock, reportedly for lack of crewmen. (March 18 report from the United States Embassy, Reykjavik.)

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MARKET FOR HERRING SOUGHT IN THE UNITED STATES:

Approximately 2,000 metric tons of frozen herring from the 1959 catch remain unsold due to failure of Soviet Bloc countries to buy their usual quotas.

This frozen herring, valued at Ikr. 12 million (about US\$315,790), will spoil if it goes unsold; therefore, the owners are making strenuous efforts to sell it in non-Communist countries. The Federation of Cooperative Societies contracted for delivery during April 1960 of 250 tons of frozen herring to West Germany, and the Freezing Plants Corporation recently shipped 45 tons to the United States in an attempt to interest buyers there.

Iceland has been singularly unsuccessful in selling salted herring in the United States during the past two years. The Managing Director of the Herring Production Board left for the United States in April to seek markets for salted herring. This and the Freezing Plants Corporation's winter and April

shipments of frozen herring to the United States indicate renewed efforts to promote Icelandic herring sales outside the Communist Bloc. (United States Embassy in Reykjavik, April 20, 1960.)

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MARKETING SURVEY FOR CANNED FISH IN UNITED STATES:

The Icelandic Government's Coordinating Committee for Foreign Aid, the Federation of Icelandic Cooperative Societies (Samband), and the Icelandic Fisheries Association plans for the marketing survey for Icelandic canned products in the United States are completed, according to a March 18, 1960, dispatch from the United States Embassy in Reykjavik.

It is proposed that the services of a United States marketing expert be engaged for a period of two months to collect data on marketing possibilities in the United States for Icelandic canned products (including, but not limited to, herring, seafood products, lamb and lamb stew).

It is hoped that the project will get under way during July 1960, but in any event it must start by September 1960.

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TRAWLER OFFICERS' DISPUTE SETTLED:

On March 22, 1960, the officers employed on Icelandic trawlers announced their intention to go on strike March 30 unless prior agreement was reached with the Association of Steam Trawler Owners on wage increases. The difficulty goes back to 1958 when the deckhands received a wage increase which the officers have since been trying to match. Both categories receive a basic wage plus a bonus dependent on the fish catch. The improvement sought by the officers in their basic salary would amount to approximately a 35-percent increase in their total income.

The dispute was settled March 31 through efforts of the State Labor Mediator. Since only two trawlers were in port to take part in the strike, its effects were minimal.

Iceland (Contd.):

Representatives of the Trawler Owners Association and the unions of the various trawler officer groups agreed to an increase of about 42 percent in bonuses based on the fish catch. No basic wage settlement was made, the United States Embassy in Reykjavik reported on March 24, 1960.



India

SMALL MODEL FISH-MEAL PLANT NOW IN OPERATION:

A small fish-meal plant, developed by a United States-educated fisheries engineer, was demonstrated in June 1959 in Bandra, Bombay. The plant was the first of its kind in India and was built entirely to suit local conditions. It requires no power and it consists of a double-jacketed dryer, a superheater, boiler and furnace, all built as one compact unit. The plant can be operated on any fuel available. Cost of operation is low, and each unit can handle some 5,000 pounds of raw fish per 24 hours. The plant is expected to cost about Rs. 6,000 (about US\$1,270).

One plant was expected to go into production in February at Manipal, District Udipi, Mysore State.



Italy

SPECIAL LICENSE SUSPENDED ON MOST FISHERY IMPORTS FROM DOLLAR AREA:

The Government of Italy no longer requires that special licenses be obtained for a number of commodities imported into that country from the United States and other nations in the dollar area. Thus, U. S. exporters of certain fishery products were placed on an equal basis, as far as tariff treatment is concerned, with exporters of similar products from non-dollar area countries.

The following fishery products were included among the items liberalized:

(1) fish--fresh, chilled, or frozen; salted or in brine, dried, or smoked; canned (in hermetically sealed containers); (2) crustaceans and molluscs (whether in shell or not)--fresh, chilled, or frozen; salted or in brine, dried, or smoked; and (3) fish and shellfish meal.

Still requiring special import licenses, however, were imports of fish oils, canned crustaceans and molluscs, and shelled crustaceans simply boiled in water (for example, peeled shrimp simply boiled in water).



Japan

SUMMER ALBACORE SEASON EXPECTED TO BEGIN EARLIER THAN USUAL:

It is generally conceded by Japanese observers that the 1960 Japanese summer albacore season will begin earlier than usual. The great mass of cold water which formed last fall off Shizuoka Prefecture coast still maintains a great strength and the Black Current is forced to go round its southern side and move northward along the Izu Seven Islands. Coming close to shore at the Nojimazaki Point, it reached the coast of Kinkazan, Miyagi Prefecture, late in March.

For this reason water temperatures along the coast late in March were 1° or 2° C. (1.8°-3.6° F.) higher than usual, and off the Nojimazaki Point were about 4° C. (7.2° F.) higher. This means that spring has come sooner to the sea and by mid-April the vanguard of summer albacore schools was expected.

News of the appearance of skipjack (small fish ranging in size from 9-13 pounds) at various points along the coast of Central Honshu was received late in March. This species, too, was about one month earlier than usual and substantiated the belief that spring oceanic conditions were beginning to prevail.

According to a spokesman for the Shimizu fish market, he had never seen skipjack landings as early as this spring. The earliest landings are usually seen in the beginning of April. He predicted

Japan (Contd.)

an early beginning of summer albacore fishing under the prevailing conditions.

The Fisheries Research Institute of Tokai University is reported to have stated that summer albacore fishing will begin earlier this year. The present oceanic conditions are similar to those in 1954 and 1955. In those years, skipjack fishing was very good but that of summer albacore was normal. In 1959, the summer albacore fishing was extremely poor but this year winter albacore fishing was fair. Good conditions, therefore, for the coming summer albacore fishing prevail. At any rate, although information with which to judge the summer fishery is incomplete, normal albacore fishing can be reasonably expected at least. (Fisheries Economic News, March 30, 1960.)

STUDY OF ALBACORE SPAWNING
IN BONIN ISLANDS AREA PLANNED:

The theory is generally accepted at the present time that the principal spawning ground of albacore in the North Pacific is the area, approximately 10°-30° north latitude, under the influence of the North Equator Current and that the peak of the summer spawning season is in the summer.

In order to verify this theory, the Nankai-ku Fisheries Research Institute will send its research vessel Shimyo Maru to waters around the Bonin Islands in June-July to conduct an oceanic investigation.

The international investigation of albacore tuna came up for discussion at the Japan-United States tuna conference held in Tokyo in October 1959. It was proposed at that time that the tuna investigations would be conducted jointly, but later it was decided that the investigations would be carried out individually. However, it was agreed that, after completion of the investigations, biological data would be exchanged.

The investigation of albacore spawning in the designated area had not been made thoroughly up to the present time.

If detailed knowledge of the albacore spawning ground in the North Pacific is obtained through the joint undertaking by Japan and the United States during the summer months, an important key to the knowledge of tuna resources will be acquired and results of the investigation are expected to produce much in connection with the development of new albacore fishing grounds. (Fisheries Economic News, March 26, 1960.)

FROZEN TUNA EXPORT QUOTAS
ESTABLISHED FOR 1960:

The 1960 export quotas for frozen tuna have been set up, according to a report of agreement reached at a mid-March meeting of the Export Frozen Tuna Fisheries Association Atlantic tuna liaison committee.

The quotas approved were slightly different than those reported earlier and are as follows:

Yellowfin 35,000 metric tons for direct shipments from Japan; for trans-shipped exports, voyages will be limited to 100 or less with the quantity in proportion to direct shipments as a premise. Loins 3,000 tons. Albacore 30,000 tons. Quotas for Italy set at 15,000 tons of tuna.

At the March 15 directors' meeting of Japan Frozen Foods Exporters Association, reports on 1960 (April 1960-March 1961) frozen tuna export regulations for Italy, frozen tuna loins export regulations, those for the frozen broadbill swordfish, and allocations of frozen albacore exports to the United States and Canada were discussed. They were approved as originally introduced and were expected to be presented to an emergency general meeting.

A meeting of the Italian division of the Association was also held. The report of the director of a Japanese fishing company, who is traveling in Europe, pointed out that the Italian tuna importers had stated that in addition to direct receipts from Japanese vessels, Japanese frozen tuna was finding its way in large quantities to Italy via Yugoslavia, France, and other countries.

Japan (Contd.):

EXPORTS OF FROZEN TUNA:

The Japan Frozen Tuna Export Sales Company compiled data on frozen tuna exports shipped from Japan from March 1, 1959, through February 1960. Frozen albacore amounted to 25,800 short tons, yellowfin to 22,900 tons, and loins to 3,970 tons. Prices (f.o.b. per short ton) ranged from a low of US\$270 to a high of US\$420 for albacore, US\$220 to US\$255 for yellowfin; prices of loins were \$730-\$885 for albacore and \$565-\$635 for yellowfin. There was a considerable fluctuation of prices during the year.

The spread in albacore prices was particularly wide because the 1959 summer albacore catch was only about half that of 1958 (24.8 million pounds), and competition between canners and freezers sent the ex-vessel price up and also for a time raised the export price. Later an increase in transshipments due to good fishing in the Atlantic brought the price down again.

Yellowfin came under regulation beginning with the 1959 export year, but because of an increase in United States demand and the problems connected with the quality and recovery of shipboard-frozen fish transshipped directly from the Atlantic fishery to the United States, exports from Japan showed a rapid increase. Loins attained the 3,000-ton quota for the 1959 export year, and are showing a stabilized trade pattern. (Nippon Suisan Shimbun, March 28, 1960.)

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CANNED LIGHTMEAT TUNA PRICE TO CANADA RAISED SLIGHTLY:

Japan Export Canned Tuna Manufacturers Association at its directors' meeting on March 11, 1960, discussed a new price list for exports to Canada. The price for Canada was raised by about ¥100 (about 25 U. S. cents) per case for lightmeat with no change for whitemeat.

Prices for exports to the United States were to be discussed at the next meeting.

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THIRD SALE OF CANNED TUNA FOR EXPORT TO UNITED STATES:

Japan Canned Foods Exporters Association is expecting the third sale of canned tuna for export to the United States soon, according to the Fisheries Economic News of March 31, 1960. Because stocks on hand are light at present, only 100,000 cases of whitemeat and 100,000 cases of lightmeat tuna will be put on sale. The prices will be \$10.15 on whitemeat and \$6.80 a case f.o.b. on lightmeat tuna, as in the recent past.

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STUDY OF OVERSEAS MARKET FOR CANNED TUNA:

The Japan Export Canned Tuna Manufacturers Association at its directors' meeting on March 11, 1960, discussed the sending of teams to the United States, Europe, and Asia to study the overseas market for canned tuna.

The United States and European teams were scheduled to leave Japan early in April. Length of the trip was to be about a month. The sending of the Asiatic team was postponed.

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POLICY ON TUNA MOTHERSHIP OPERATIONS:

The Japanese Fishery Agency is reported to have started to consider its licensing policies for the mothership tuna fishery in 1960. Last year the policy was to grant permission to those firms that had past records (4 fleets operated in 1959), but this year a new policy may be adopted in connection with the reorganization of Japan's northern seas fisheries. The fishery companies' views are: (1) expansion of operation area, (2) use of catchers carried on board the motherships, and (3) licensing of new mothership fleets.

The Fishery Agency seems to be reluctant at present to expand the operational area but a study will be made on small catchers carried aboard the mothership and increased number of motherships resulting from reorganization of fisheries in northern seas.

Japan (Contd.):

Each mothership company is busy making preparations and asking authorities in charge to clarify their stand regarding this year's policy. (Fisheries Economic News, March 25, 1960.)

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LARGE-SIZE TUNA VESSEL LAUNCHED:

At the Shimizu shipyard of a Japanese firm, a large size tuna vessel-freezer-carrier, Eio Maru, 1,280 tons, was launched for one of the large Japanese fishing companies.

The ship was expected to be completed at the end of April and sail for the Indian Ocean to carry out tuna fishing, using its 19-ton catcher, carried on board. (Fisheries Economic News, March 30, 1960.)

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CRAB FACTORYSHIP SAILS FOR BRISTOL BAY:

The Japanese crab factoryship Tokai Maru (5,286 tons) left the port of Hakodate, April 5, 1960, for Bristol Bay, Alaska, to fish and process king crabs. The vessel is jointly operated by two Japanese fishing companies.

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FISHING COMPANY STARTS TRAWLING OPERATION IN NORTH AFRICA:

A Japanese fishing company has established a joint fishing company at Tangier, Morocco, Africa, to carry out trawling operations. The Japanese ves-

sel Taiyo Maru No. 6, which is a part of the Japanese investment in the enterprise, is understood to be on its way to Italy with its first catch. With extremely abundant bottomfish, including sea bream, the value of the fishing ground is considered high. The Japanese firm is said to be planning to send 5 trawlers of the 1,300-ton class and begin regular trawling operations. It also plans a cold-storage facility at nearby Las Palmas in the Canary Islands (Spanish territory).

The Japanese firm's plan was for the operations to begin in May. Catches will be landed at the Las Palmas base and sorted out for Europe and Japan. A thorough investigation of local conditions is being expedited. The Spanish, however, are said to be planning to refuse permission for the Japanese to operate out of Las Palmas unless their joint investment formula is accepted. Also, Spanish registration is required for operations in its territorial waters and shipments of some of the catch to Japan must take the form of exports from Spain.

Trawling operations are planned in the area, south of 25° South latitude off the eastern coast of Africa. At present, plans call for two trawlers of the 1,300-ton class to operate in the designated area.

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FISHING VESSELS LICENSED FOR CONSTRUCTION, APRIL 1, 1959-MARCH 31, 1960:

From April 1, 1959, to March 31, 1960, the Japanese Fisheries Agency issued licenses for 1,062 fishing vessels (including 16 Government vessels)--a total of

Japanese Fishing Vessels Licensed for Construction, April 1, 1959-March 31, 1960

Vessel Type	Total		Steel		Wood	
	Number	Gross Tons	Number	Gross Tons	Number	Gross Tons
Whale catcher	3	1,068	2	1,039	1	29
Otter trawler	6	9,023	6	9,023	-	-
East China Sea trawler	100	8,180	95	7,853	5	347
Medium trawler	134	5,786	22	1,906	112	3,880
Tuna boats	322	39,823	93	28,969	229	10,854
Seiners	145	6,040	61	3,584	84	2,456
Mackerel pole and line	42	1,638	-	-	42	1,638
Lift netters	42	1,685	3	252	39	1,433
Miscellaneous long-liners	109	5,305	12	878	97	4,427
Salmon gill-netters	68	3,239	16	1,335	52	1,904
Carriers	22	20,473	7	20,040	15	433
Government vessel	16	2,406	8	1,935	8	471
Other	53	1,504	-	-	53	1,504
Totals	1,062	106,170	325	76,794	737	29,376

Japan (Contd.):

106,170 gross tons. The total vessels licensed for construction included 325 steel vessels (76,794 gross tons) and 737 wooden vessels (29,376 gross tons). Eighteen vessels totaling 1,205 gross tons were licensed for construction, but the licenses were withdrawn during the fiscal year. The 325 steel vessels averaged 236.3 gross tons and the 737 wooden vessels averaged 39.9 gross tons in size.

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FISH MEAL AND FLOUNDER FACTORYSHIP OPERATIONS IN BERING SEA FOR 1960:

This year there will be a total of four Japanese fleets producing fish meal and flatfish in North Pacific waters, two operated by the Hokuyo Suisan Company, one by Taiyo Gogyo, and one by Nippon Suisan. They were due to leave their bases between April 16-22 for about four months of operation in the Bering Sea. This year a total fish-meal production of 53,500 tons is planned of the quantity, about 36,000 tons will be for export and the remaining 17,500 tons will be sold on the domestic market.

The first fish-meal factoryship operation was conducted by the Hokuyo Suisan Company with one fleet in 1958. In 1959 there were two such fleets, and this year full-scale operations will be carried on with four fleets. The industry considers that four fleets is probably the limit, in terms of fishing grounds and the fishery resource. Even in last year's operations, competition with the flatfish freezing fleets became somewhat of a problem, and from the standpoint of the resource an operating scale of four fish-meal fleets seems likely to become the standard. However, in terms of breaking even financially, all of the companies fear that operating for fish-meal production alone will be unprofitable, and so they are placing more emphasis on frozen products, liver oil, solubles, and other byproducts in order to utilize all the raw material. The companies--Taiyo Gogyo and Nippon Suisan--which are newly entering the field, are also looking at fish-meal operations as a compensation for the cutback of their salmon fishing, but they are taking a cautious view of the profit possibilities, and for that reason this year's fish-meal fishery will be watched with great interest.

Composition of the fleets and production plans are as follows:

Hokuyo Suisan Company: Kinyo Maru fleet: 24 fishing boats (16 pair trawlers, 8 single trawlers), 1 scouting boat. Planned catch, 48,000 tons of raw fish. Planned production, 13,500 tons of meal, 450 tons of liver oil, and 200 tons of frozen fish. Renshin Maru fleet: 27 fishing boats (22 pair trawlers, 5 single trawlers), and 2 scouting boats. Planned catch, 99,000 tons of raw fish. Planned production, 14,000 tons of meal, 450 tons of liver oil, 2,500 tons of solubles, and 4,000 tons of frozen products.

Taiyo Gogyo Company: Soyo Maru fleet: 30 fishing boats (14 pair trawlers, 16 single trawlers). Planned production, 13,000 tons of meal, 6,500 tons of frozen products, and 3,800 tons of solubles.

Nippon Suisan Company: Gyokuei Maru fleet: 25 fishing boats (11 pair trawlers 1/1, 14 single trawlers). Planned catch, 85,079 tons of raw fish. Planned production, 13,068 tons of meal, 2,650 tons of frozen products, 750 tons of liver oil, and 1,500 tons of solubles.

The Kinyo Maru and the Renshin Maru were due to sail from Hakodate on April 16, the Soyo Maru sailed from Tokyo on the 13th, and the Gyokuei Maru was due to sail from Kobe on April 22.

A reception was held at Yokohama on April 11 aboard the Hokuyo Suisan Company's new fish-meal ship Renshin Maru (14,094 gross tons), a former oil tanker. The reception was attended by the Director and former Director of the Japanese Fisheries Agency.

The President of the Hokuyo Suisan Company stated that his ambition was to change fish-meal from a food for chickens and pigs to a food for humans, and that this was why the Renshin Maru has been equipped with refrigeration and with a filleting and fish-skinning machine.

The Renshin Maru is 167 meters long, 21 meters abeam, and has a 7,000 hp. Diesel engine giving a speed of 14 knots. Equipment includes two fish-meal lines, giving a daily production capacity of 100 tons; one fish skinning and filleting machine handling 30-40 fish per minute; freezing capacity of 40 tons per day; and refrigerated cargo space for 2,000 tons. (Nippon Suisan Shimbun, April 13, 1960.)

Obviously can't have an odd number of pair trawlers. Real distinction is between trawlers of type licensed to fish west of 130° E. longitude, mostly over 55 tons and mostly pair trawlers, and boats licensed only to fish east of that longitude, which are mostly under 50 tons and mostly single trawlers.

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HERRING CATCH OF ABOUT 9,000 TONS IN BERRING SEA EXPECTED:

Two Japanese fishing companies expect to do experimental fishing for herring, using boats attached to the fish-meal fleets which are operating in the Bering Sea. According to the two Companies' tentative plans, the Kinyo Maru fleet is to catch 3,000 metric tons, while the Gyokuei Maru fleet is scheduled to catch about 2,000 tons. In addition, one company will send its Shinyo Maru fleet and the other company its Itsukushima Maru fleet into the Bering Sea for mother-ship-type frozen flatfish operations, and these fleets will take, respectively, about 2,700 tons and 1,000 tons of herring. Thus the total planned herring catch for the two companies is about 8,700 tons. (Suisan Keizai Shimbun, April 13, 1960.)

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NORTH PACIFIC MOTHERSHIP SALMON FLEET REDUCED IN 1960:

The Japanese North Pacific mother-ship salmon fishing fleets in 1960 will consist of 12 motherships and 410 catcher vessels. This compares with a fleet of 16 motherships and 460 catcher vessels in 1959. The same five Japanese fishing companies will participate in the 1960 salmon fishery.

One firm with 6 motherships and 173 catchers in 1959 will have 4 motherships and 154 catchers in 1960. A second firm with 5 motherships and 145 catchers in

Japan (Contd.):

1959 will operate 4 motherships and 129 catchers in 1960. Two additional firms which operated 4 motherships (one mothership was a joint venture) and 114 catchers are allowed 2 motherships and 66 catchers in the case of one of the firms and 1 mothership and 36 catchers for the other firm. The fifth firm will operate one mothership in 1960 as in 1959, but catchers are reduced from 28 in 1959 to 25 in 1960.

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FORMER SALMON MOTHERSHIP TO ENTER BERING SEA FISHERY:

The former salmon mothership Meisei Maru, purchased about March 1960 from the Nichiro Fishing Company by the Hokuyo Suisan Company, has been renamed the Shinyo Maru. She is to be sent to the Bering Sea to produce frozen crab on the following production plan: 200 tons of frozen crab (equivalent to 20,000 cases of canned crab), 2,700 tons of frozen her-ring, 700 tons of frozen cod, and 400 tons of frozen rockfish and Alaska pollock. (Nippon Suisan Shimbum, April 13, 1960.)

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ANTARCTIC WHALING CATCH HIGHER FOR 1959/60:

After some indecision, the Japanese Fisheries Agency called a halt to the 1959/60 Antarctic whaling season at midnight, March 26, and the six Japanese whaling fleets left for home. In this, the first postwar season in which the catch limit set by the International Whaling Commission was inoperative, because of the withdrawal of Norway and the Netherlands, the Japanese fleets took a total of 5,217 blue-whale units. This was the largest Antarctic whale catch made by Japanese whalers in the postwar period, and was 179 blue-whale units more than the Japanese caught in the 1958/59 season.

Norway was reported to have caught a total of 4,112 units as of March 26. The European fleets, however, remained on the whaling grounds in an attempt to improve their catches in the last few days of the season, which under Whaling Commission rules ended April 7.

Not all of the three Japanese operating companies fared equally well this season. The two fleets of one company filled their initial catch quota as well as the increase granted by the Fisheries Agency just before the end of the season. The two fleets of another company filled the company's initial quota, but ended with 41 units short of the additional quota. But this company's factoryship No. 2 Nisshin Maru, with a catch of 1,121 units, was the top boat among all of the Antarctic fleets, except for the two Soviet expeditions.

It had been anticipated that Antarctic whaling this season, with two countries' fleets operating outside of the 15,000-unit over-all catch limit of the Whaling Commission, might result in an excessively large catch of 17,000-18,000 units. This danger seems to have faded now, as the total catch by all countries as of March 26, was only 14,676 units (total as of April 7 was estimated to be about 15,437 units). Reports reaching Japan from the Antarctic have tended to blame the generally poor whaling this season on bad weather. However, if the European whalers ascribe their poor performance to a scarcity of whales, there should be a renewed interest in getting all of the Antarctic whalers back under the regulations of the International Whaling Commission. (United States Embassy in Tokyo reported on April 1, 1960.)

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LICENSE FOR NEW NORTH PACIFIC WHALING FLEET REQUESTED:

Officers of two large Japanese fishing companies called on the Director of the Japanese Fisheries Agency on April 11, 1960, to present their companies' joint request for permission to engage in mothership-type whaling operations in the North Pacific. The Director of the Fisheries Agency did not give immediate approval.

The plan of the two companies calls for use of the Dutch mothership Bremendal (10,725 tons, 2,400 hp. Diesel, 13 knots speed) with seven of the 700-ton catcher boats belonging to the Dutch William Barentz fleet. The catch would be 600 blue-whale units of baleen whales the first year only, with 800 units thereafter, and 300 sperm whales.

Japan (Contd.):

It was pointed out to the applicants that using the vessels of a country that has abrogated the Whaling Convention raises a moral problem, and furthermore it was agreed at the meeting of the International Whaling Commission that no aid would be given to the nations which left the Convention. (*Nikkan Suisan Tsushin*, April 12, 1960.)



Korea

PROCESSORS CLOSE CONTRACTS FOR SHRIMP IN APRIL:

After a lull during March 1960, two Korean shrimp processors resumed activities during April. A US\$8,000 contract with the U. S. Army was signed. Also, a contract valued at US\$13,000 for frozen shrimp for export was closed with private business interests.



Kuwait

U. S. FIRM STARTS FISHING FOR SHRIMP:

An American firm in Kuwait has started fishing for shrimp, which are then frozen and exported, according to a March 26, 1960, report from the United States Consul in Kuwait.

Fishing in Kuwait (south of Iraq on the northwest coast of Persian Gulf) is carried out by small craft using primitive methods. These craft catch just about enough fish to take care of local needs, but none for export.



Libya

FISHERIES TRENDS, FOURTH QUARTER 1959:

The Tripolitanian fishing and canning operations were extended to late September 1959 by the appearance of a Japanese deep-sea trawler fleet. Fishing activity returned to its dormant pattern,

however, during the last quarter of 1959, but canning was reported to have extended to mid-quarter.

Available statistics regarding exports of fresh fish from Tripolitania indicate a considerable decrease from the amounts exported in 1958 for the same period. High domestic prices indicated that the catch was not being sold locally and that the production was proportionately also less than recorded for 1958, which was considered a good year.

Statistics on the landings of tuna were unavailable for the last quarter of 1959, but it is believed that the Japanese fleet increased the landings of tuna. Export of canned tuna reached record proportions in July and August 1959, but leveled off in September. During May-September 1959, 457 metric tons of canned fish were exported as compared with 255 tons exported in the same period of 1958, and 458 tons in May-September 1957. Indications are that exports during October-December 1959 will show a significant increase over levels of former years, due to the time lag in processing the catch.

There was no officially-recorded activity among the once flourishing Cyrenaican sponge fishing industry and consequently no landings. The Tripolitanian sponge industry also appears to have deteriorated further over levels of former years. Statistics for sponge exports at mid-1959 showed a countrywide total of 685 kilos (1,500 pounds) exported as compared with a total of 26,000 kilos (57,320 pounds) for all of 1958, and about 27,000 kilos (59,524 pounds) in 1957. Deep-sea fishing boats, mostly of Greek origin, made port in the country's harbors from time to time for provisioning and to escape some violent gales during the latter part of 1959.

Some observers feel that Libyan impediments to coastal sponge fishing by foreign divers might wreak severe harm to the sponge beds which require regular harvesting to remain healthy. The 1959 production of sponges in Cyrenaica is as yet unknown. A long established and reliable sponge dealer in Tripolitania has confirmed earlier estimates that the Province's sponge harvest was approxi-

Libya (Contd.):

mately 6,000 kilos (13,228 pounds) at most. Prices for export in 1959 were the best in years with first-grade sponges selling at US\$22.40 a kilo (\$10.16 a pound) while fourth-grade sponges sold at US\$2.80 a kilo (\$1.27 a pound). Mixed sponges were quoted at US\$9.80-\$11.20 a kilo (\$4.45-\$5.08 a pound). According to unofficial reports the bulk of the sponges were shipped to Italy. (United States Embassy, Tripoli, February 8, 1960.)



Mexico

DECREE PROHIBITS VESSELS FROM FISHING WITHIN NINE MILES OF BORDER:

A Mexican Executive Decree dated March 26, 1960, prohibits Mexico's fishing fleets from carrying out marine fishing activities within 9 nautical miles of her boundaries with other countries. Nonfishing zones for Mexican vessels are being set up that extend 9 miles into the sea along the borders and 9 miles along the Mexican coast adjacent to the borders.

Furthermore, Mexican vessels are only authorized to fish in Mexican territorial waters or on the high seas, unless it has been properly established that another country has granted permission for Mexican vessels to fish within their territorial waters. Mexico claims 9 nautical miles as territorial waters.

This Decree, which entered into effect 10 days after publication, provides stiff penalties for violators. Permissionaires or concessionaires, owners, proprietors, lessees, and masters are held jointly and severally liable for violations. Masters may have their licenses suspended for as much as one year. Fines amounting up to 100,000 pesos (US\$8,000) may be assessed owners etc., and those in possession of permits or concessions shall have them cancelled. Provision is also made for seizure and auction of the vessel, if necessary, to cover the amount of the fines.

The purpose of the Decree is to maintain and develop good international relations. In recent months reports have again been current that Mexican shrimp boats had been fishing in the Pacific in waters to the south of Mexico. At the end of 1958 Guatemalan airplanes fired upon Mexican shrimp boats, allegedly fishing illegally in Guatemalan waters, and several fishermen were killed. This led to a severance of relations between the two countries which lasted a number of months.

For more than a year Mexican patrol boats have been maintaining guard along the Guatemalan border in an attempt to prevent Mexican shrimpers from entering Guatemalan waters. Various boats have been detained and fines and penalties have been placed on the owners and masters. (United States Embassy, Mexico, March 29, 1960.)

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GULF OF CALIFORNIA SHRIMP FISHERY TRENDS, MARCH 1960:

The shrimp fishing fleet out of Guaymas on the west coast of Mexico was tied-up during most of the January-March 1960 period due to a dispute between the Confederacion Nacional de Cooperativas Pesqueras (National Federation of Fishery Cooperatives) and the Camara Nacional de la Industria Pesquera (National Chamber of the Fishing Industry) over the interpretation of certain clauses in their contract. The cessation of activity lasted for 74 days, during which time the 150 boats comprising the Guaymas shrimp fleet remained at anchor in the bay, and over 3,000 families dependent on this industry had no source of income. Since the boats were inactive, the shrimp freezing plants and packing plants also remained idle.

After settlement of the dispute on March 19, over half of the boats could not sail because of damages suffered during the period of inactivity. About 30 vessels had to be hauled out for repair work before they could be considered seaworthy and other vessels had gone to other ports in the Gulf of California.

Aside from the dispute at Guaymas, shrimp catches were described as medi-

Mexico (Contd.):

ocre to poor, and vessel owners reported that they were operating at a loss of over 500 pesos (about US\$45) a metric ton under the then existing agreement with the cooperatives. The prices for shrimp exported to the United States were down about 20 percent from the previous year and the industry in the Guaymas area was fearful that the increasing competition in the United States market from Far East competitors would soon force the Mexican industry out of business unless some preferential treatment could be arranged for the Mexican product. The Mazatlan shrimp industry appeared more optimistic due to the recent decline in the stocks of fresh shrimp in the United States and the increase in prices which occurred during the Guaymas shutdown.

The Mazatlan shrimp fleet of 204 vessels which was not hampered by disagreements between vessel owners and cooperatives landed a total of 3,845 metric tons of shrimp for the season from October 1959 through February 1960. Landings of shrimp have been described as "good" and better than last year, due to the heavy rains and the opening of new fishing grounds. Shrimp catches were expected to decline quite rapidly between the end of February and the beginning of the closed season on May 15. (American Consulate, Nogales, Sonora, Mexico, March 31, 1960.)

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SPINY LOBSTER AND ABALONE FISHERIES TRENDS:

Spiny Lobster: During the 1959/60 spiny lobster fishing season in the Ensenada area of Mexico which ended on March 15, 1960, estimated landings amounted to only 1,250,000 pounds. This amount was lower by 25 percent from the 1,600,000 pounds landed during the 1958/59 season. The highest landings in the past seven seasons were made in 1954/55 when a total of 2,200,000 pounds was landed. In the 1957/58 season landings were 1,700,000 pounds, in 1956/57 season 1,800,000 pounds, in 1955/56 season 2,000,000 pounds, and in the 1953/54 season 1,969,000 pounds.

Despite the poor landings in the 1959/60 season, the Regional Federation of Fishing Cooperatives was able to repay the Banco de Fomento Cooperative the current loan of about US\$120,000 and amortize about \$52,000 of the \$737,000 outstanding debt.

Abalone: The landings of abalone for the season that ended on December 15, 1959, according to an unconfirmed report, amounted to about 6 million pounds.

The 1960 abalone fishing season opened on March 16, and the fishermen are predicting another good year due to new equipment which permits them to fish in deeper water. About 800 families are dependent on the abalone catch for a living. Due to the refusal of the Cooperative Bank to grant credit to the fishing cooperatives, they were forced to obtain necessary funds from the abalone packing firms. (United States Consulate, Tijuana, March 29, 1960.)

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STATEMENT ON LAW OF THE SEA CONFERENCE:

A statement was released on March 10, 1960, by the Mexican Ministry of Foreign Relations concerning the Second Conference on the Law of the Sea at Geneva, which opened on March 17.

The statement announced that the Mexican delegation would push the same formula which it advocated at the First Conference, namely at flexible 3- to 12-mile limit at the option of each coastal state. However, the statement also announced that the delegation would be conciliatory and disposed to cooperate with other states in the hope of reaching a common accord. (United States Embassy, Mexico, March 11, 1960.)

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TAMPICO AREA SHRIMP FISHERY TRENDS, APRIL 1960:

Two United States shrimp vessels were seized for alleged fishing in Mexican territorial waters at Tuxpan in early February 1960, but after being held for 10 days were released, the seizures being declared illegal. At about the same

Mexico (Contd.):

time, 6 more U. S. vessels were seized at Tampico, each one having to post a bond of 30,000 pesos (US\$2,400).

The fishing industry has been vocal in the local press against: (1) the Santos "dynasty" in Mexico City, which they feel is responsible for the sad plight of fishermen throughout the country; and (2) the poor weather that kept the fishing fleet in the port of Tampico almost continuously during January and February.

The resignation at the end of March of the Director General of Fisheries was welcomed as a step in the right direction by the Federal Government to alleviate the economic situation of the industry. The weather improved in March, but the complaint was that there was no shrimp.

An American technician on a Mexican boat states that there are no shrimp along the coast west of Campeche, which is east along the Gulf coast almost to Yucatan. Local boats will not go that far afield for shrimp, a Tampiqueno preferring to go out in the early evening to fish in local waters and to return at dawn.

Undoubtedly United States boats are operating in the vicinity of Campeche as their presence has not been reported in the coastal waters of Tamaulipas and Veracruz since the middle of February. (United States Consulate, Tampico, April 5, 1960.)



Netherlands

JAPANESE MAY PURCHASE WHALING VESSELS:

Two Japanese whaling companies have approached the Netherlands Whaling Company in Amsterdam about the possibility of buying the Dutch whale-oil tanker Bloemendaal, which has an estimated value of fl. 10 million (about US\$2.7 million), and some old Dutch catchers located at Capetown, South Africa. The Bloemendaal was built in 1931 (at which time it was called the William Barendsz) and originally used as a factoryship. Official negotiations have not yet been held,

but it is possible that a Japanese delegation will soon visit the Netherlands for this purpose. (United States Embassy report from The Hague, April 19, 1960.)



New Hebrides

TUNA OPERATIONS:

Tuna operations in the New Hebrides (South Pacific) are conducted out of Santos by a fleet of 7 Japanese long-liners and crews. The boats are between 80 and 150 tons, carry an average of 20 men, and catch about 40 tons of yellowfin, big-eyed, and albacore tuna in a 3-week trip, which may take them to fishing grounds as far as 600 miles from their base.

The lines are generally set once a day, either at dawn or sunset, when the fish are believed most likely to take the bait, which consists of frozen mackerel-pike imported from Japan. One ton of bait is said to catch about 50 tons of tuna, if fishing is good. It takes $4\frac{1}{2}$ hours to set the lines which are left in the water $2\frac{1}{2}$ hours. It takes 13 hours to haul back and ice-down the fish in the holds. The fish are packed in crushed ice, not frozen. After stowing is completed, the men sleep for three hours, when it is time to set the lines again. This goes on for three weeks, as a rule, by which time the hold is full and the vessel can return to base. If the catch is 40 tons, the vessel ties up for 24 hours only, to allow the fish to be unloaded, weighed, and put into the freezer ashore; the vessel is fueled, iced, and leaves for another three-weeks trip.

The frozen albacore tuna is sent to the United States, other products to Japan. The base employs 34 Japanese ashore, helped by 35 local workers, and 5 local Europeans. The 34 Japanese are to be replaced gradually by local workers, as soon as they can be trained. The present freezer is capable of holding about 700 tons of fish; and there is an ice-making plant of 10 tons per batch. Over 100 tons of oil are used at present per month to fuel the boats and generate electricity for the shore installations. (Pacific Islands Monthly, July 1958.)



New Zealand

REACTION TO JAPANESE FISHING IN NEW ZEALAND WATERS:

The New Zealand press reported on March 15, 1960, that the Japan Fishery Board had decided to start full-scale Japanese trawling in the waters around New Zealand this year. A New Zealand fishing industry spokesman expressed alarm at this decision, stating that New Zealand fishermen were subject to certain conservation rules while Japanese fishermen would be unregulated.

Asked for comment, the New Zealand Minister of Marine stated that "he personally and the Government would do all possible to ensure the protection of the New Zealand fishing industry." Several newspaper editorials questioned why the New Zealand fishing industry was not fully using the resources available in the area. (United States Embassy, Wellington, report of March 17, 1960.)



Norway

WINTER HERRING LANDINGS LOWEST IN 15 YEARS:

The 1960 winter herring fishery off Norway's west coast ended late in March with landings of only 299,870 metric tons (3,220,000 hectolitres)--the lowest landings since the war. The landings from the fat herring phase of the winter fishery, which ended on February 23, were about 200,000 tons. The second phase (spring herring) of the winter herring fishery added only about 100,000 tons to the 1960 season's total. The Norwegian herring industry has a capacity to handle about 1,118,000 tons (12 million hectolitres) and landings of 745,000 tons (8 million hectolitres) are needed to show a profit for the season.

The serious economic situation created by the failure of the winter herring fishery has been recognized by the Norwegian Government. A special committee has been appointed to investigate the entire matter and make recommendations for the future. In addition, the sum of about US\$700,000 has been made available for financing public works in the areas

hardest hit by the herring fishery failure. (United States Embassy dispatch from Oslo, April 13, 1960.)

ONE-NINTH OF HERRING PURSE- SEINERS CAUGHT NO FISH IN 1960 SEASON:

A total of 50 of the 450 purse-seiners which took part in Norway's winter or fat herring fishery this year had no catch at all. About 300 of the vessels landed less than 3,000 hectoliters (270 metric tons). Crews aboard all these vessels may claim the Kr. 100 (US\$14.00) a week subsidy guaranteed by the state. (News of Norway, March 31, 1960.)



Pakistan

SURVEY FOR MOTHER-OF-PEARL IN BAY OF BENGAL PLANNED:

The Pakistan press reports that the Central Government has decided to conduct a survey of the sea bed surrounding St. Martin's Islands off the southern tip of East Pakistan to ascertain the quantity of mother-of-pearl deposits found at a depth of six fathoms in 1955. A button industry is under consideration, with the waste to be used in toothpaste manufacture. Because there are no Pakistani deep-sea divers, foreign divers and equipment will have to be used if the survey is made. (United States Embassy in Karachi, April 28, 1960.)



Peru

FISH MEAL INDUSTRY TRENDS, APRIL 1960:

Several problems of the Peruvian fishmeal industry have been before the public recently. Bad odors from nearby plants which have invaded the Lima area for several months reached a stage which forced the several municipalities to take action requiring the elimination of their causes. Plants have been given a limited period to do so. In that respect they have been aided by a labor dispute between the anchovy fishermen and the reduction plants which began on April 13, 1960.

Peru (Contd.):

The shutdown of the fish-meal plants due to the dispute has permitted cleaning of equipment and plants, and installation of new deodorizing equipment.

The labor dispute, which affects only anchovy fishermen, is concerned with the following: (1) an assured sum of S/80 (US\$2.89) per ton of fish caught for division among vessel crews; (2) larger allowances for food while at sea, (3) free paid Sundays, and (4) the same benefits as those given labor in other branches of the economy. Benefits to the anchovy

raising of new barriers against Peruvian products. (United States Embassy dispatch from Lima, April 15, 1960.)

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EXPORTS OF MARINE PRODUCTS, FOURTH QUARTER AND YEAR 1959:

Exports of principal marine products by Peru in 1959 amounted to 364,187 metric tons (valued at US\$44.6 million). Fish meal exports (277,600 tons) for 1959 were up about 138.1 percent from the 116,598 tons exported in 1958 and 308.5 percent from the 67,951 tons exported in 1957. Exports of fish oil were also

Peruvian Exports of Principal Marine Products, October-December and Year 1959

Marine Products	Oct.-Dec. 1959			Year 1959		
	Quantity	Value1/		Quantity	Value2/	
	Metric Tons	Million Soles	US\$ 1,000	Metric Tons	Million Soles	US\$ 1,000
Fish meal	93,510	276.6	9,986	277,600	860.5	30,842
Fish (frozen, canned, etc.) .	13,251	68.8	2,484	43,734	266.6	9,556
Fish oil	3,351	8.4	303	17,165	44.7	1,602
Sperm oil	2,100	7.6	274	10,004	33.9	1,215
Fertilizer (guano)	8,318	20.1	726	11,767	28.3	1,014
Whale meal	792	1.9	69	3,917	9.7	348
Total	121,322	383.4	13,842	364,187	1,243.7	44,577

1/F.o.b. values, converted at rate of 27.70 soles equal US\$1 for 4th quarter of 1959.

2/F.o.b. values, converted at rate of 27.90 soles equal US\$1 for 1959.

fishermen have lagged behind other industries because labor legislation has not kept pace with the rapid development of the fish meal and oil industry. The 13-day tie-up of the anchovy fishermen ended on April 26 without any settlement of the issues at stake. However, it is hoped that the differences between the fishermen and the fish meal industry will be settled by negotiation.

A special commission appointed last December has submitted regulations governing labor conditions in the fishing industry, particularly relations between vessel owners and fishermen. The regulations were promulgated April 15, but benefits provided are not applicable, however, to the anchovy fisherman.

Reports that United States and British fish-meal producers are seeking protection against Peruvian fish-meal exports have resulted in forecasts of paralyzation of many Peruvian plants, and strong suggestions that the Government and public opinion should fight the

up sharply in 1959. (United States Embassy dispatch from Lima, March 24, 1960.)

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BAN ON SHRIMP SALES LIFTED:

After three months of rigid enforcement, the Peruvian ban on the sale of shrimp was lifted on March 31, 1960. As a result of the closed season, the shrimp offered for sale was of good size and brought between S/20 and S/25 per kilo (32.7-40.9 U. S. cents a pound). About 1,400 kilos (3,086 pounds) were sold in Lima on the first day of permitted sale, most of it caught in Southern Peru, particularly in the Department of Arequipa, the United States Embassy in Lima reported in April 4, 1960.)

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FISHERIES PROGRAM FOR 1960:

The Peruvian Bureau of Fisheries and Hunting of the Ministry of Agriculture has announced that its program for the cur-

Peru (Contd.):

rent year will include: (1) an investigation of aquatic resources, principally bonito; (2) cultivation of fresh-water trout, shrimp, and other fish; and (3) technical studies on quality control and improvement of fishery products.

If projects now under study by the Ministry of Marine are carried out, a school of fisheries and navigation will be established in the near future near Ancon, a seaside resort a few miles north of Lima. (The United States Embassy dispatch from Lima, March 22, 1960.)



Philippines

BAN ON THE EXPORT OF ORNAMENTAL SEA SHELLS PROPOSED:

According to press reports, Philippines manufacturers of pearl or shell buttons requested the Secretary of Commerce and Industry to have the present ban on exports of sea shells and other raw materials extended to cover ornamental shells. They reportedly complained that local supplies of ornamental shells were inadequate to meet their needs because of exports to Japan, Italy, France, and the United States. Lack of raw materials was given as a principal reason why the Philippines was unable to fill its duty-free export quota of pearl or shell buttons to the United States. Another reason given was the illegal exportation of shells.

The Secretary is reported to have informed the button manufacturers that he would first examine available data on the annual supply of commercial and ornamental shells in the Philippines and its disposition before acting on the total ban recommendation. (The United States Embassy dispatch from Manila, April 8, 1960.)



Portugal

CANNED FISH EXPORTS, 1959:

Portugal's exports of canned fish during 1959, amounted to 76,985 metric tons (4,194,000 cases), valued at US\$39.7 million, as compared with 68,102 tons, valued at US\$36.0 million in 1958. Sardines in olive oil exported during 1959 amounted to 59,136 tons, valued at US\$29.0 million.

Portuguese Canned Fish Exports, January-December 1959

Species	Jan.-Dec. 1959	
	Metric Tons	US\$ 1,000
Sardines in olive oil	59,136	29,001
Sardine & sardinelike fish in brine	1,624	347
Tuna & tunalike fish in olive oil	3,936	2,777
Anchovy fillets	6,359	4,678
Mackerel in olive oil	3,236	1,636
Other fish	2,694	1,299
Total	76,985	39,738

During 1959 the leading canned fish buyer was Germany with 16,899 tons (valued at US\$8.5 million), followed by Italy with 10,199 tons (valued at US\$6.0 million), Great Britain with 7,688 tons (valued at US\$3.6 million), United States with 7,340 tons (valued at US\$5.0 million), and Belgium-Luxembourg with 5,026 tons (valued at US\$2.5 million). Exports to the United States included 2,707 tons of anchovies, 1,027 tons of tuna, 3,368 tons of sardines, and 40 tons of mackerel. (Conservas de Peixe, February 1960.)

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CANNED FISH PACK, 1959:

The total Portuguese pack of canned fish for 1959 amounted to 62,459 metric tons. Canned sardines in oil (49,438 tons) accounted for 79.2 percent of the 1959 pack, the February 1960 Conservas de Peixe reports.

Portuguese Canned Fish Pack, 1959

Product	Net Weight	
	Metric Tons	1,000 Cases
<u>In Olive Oil:</u>		
Sardines	49,438	2,602
Sardinelike fish	552	44
Anchovy fillets	5,624	562
Tuna	4,495	161
Mackerel	583	23
Other species	1,467	78
Total	62,459	3,470

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Portugal (Contd.):

FISHERIES TRENDS, DECEMBER 1959:

Sardine Fishing: In December 1959 the Portuguese fishing fleet landed 10,434 metric tons of sardines (valued at US\$1,117,739 ex-vessel or about \$107 a ton). During January-December 1959 a total of 123,314 tons of sardines was landed (valued at \$11.9 million).

Canneries purchased 55.5 percent or 5,789 tons of the sardines (valued at \$687,791 ex-vessel or about \$119 a ton) during December 1959. A total of 4,622 tons was purchased for the fresh fish market and 23 tons were salted.

Other Fishing: December 1959 landings of fish other than sardines were principally 7,555 tons of chinchards (value \$264,869). (Conservas de Peixe, February 1960.)

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FISHERIES TRENDS,FIRST QUARTER, 1960:

Sardine fishing was inactive during the first quarter of 1960, but the fleet sailed from Matosinhos on April 1, recording a catch with this early start. The sardine closed season began on January 20 and ended in mid-March on varying dates for different ports.

Landings of sardines in 1959 (123,283 metric tons) were good in spite of the pessimistic views which prevailed at one time. While the 1959 catch was less in volume than in 1958, its over-all value was about 8 percent greater.

Canned fish exports in the first two months of 1960 were about 33 percent higher in value and volume than in 1959. The increase reflects larger sardine exports, as shipments of both anchovies and canned tuna were less than in the corresponding period of 1959. Large shipments to West Germany accounted for much of the increase.

Developments in the trawl fishery included the launching of two new trawlers—one for coastal and the other for high seas operations. A new fishing dock at Vila Real de Santo Antonio in southern Portugal was completed early this year at an estimated cost of about US\$25,000.

With hopes for a better season (1959 was poor) than they have enjoyed for the past two years, most of the cod-fishing fleet left for the Newfoundland Banks after the blessing of the fleet on April 3. There appears to be no prospects for a long-term solution to the problem of dried cod supply. The government has continued to place limited supplies on the market at regular intervals and although supplies at retail are not abundant, no serious shortage has developed. Ceiling prices, with the exception of the rise permitted in December on the highest grades, have been maintained as promised by the Secretary of State for Commerce in October 1959. Imports of dried cod in January-February have been very limited—705 metric tons as compared with 4,031 metric tons in January-February 1959, illustrating the difficulty which Portugal has had in supplementing its domestic supply with imports from the world market.

Reflecting Portugal's concern over this year's Conference on the Law of the Sea and its cod-fishing industry, the Portuguese Ambassador in Ottawa, in a press conference on February 9, said that Portugal could never accept the Canadian proposal on the law of the sea which would increase territorial waters for fishing purposes to 12 miles.

Other events in government during the first quarter of 1960 were the appointment of two committees to study fishing subjects. The first, headed by the Director of the Portuguese Institute of Marine Biology, will study metropolitan Portugal's resources of agar-bearing seaweeds. (Studies on the supply of agar-bearing seaweeds in the Azores have been completed, but the results have not been announced.) The second has the more comprehensive objective of reviewing the situation in the Portuguese fishing trade and industry, particularly with respect to the effect of government regulations. At the end of two months the committee is to recommend measures to assure a more adequate supply and more regular flow of fish to the domestic market, the United States Embassy in Lisbon reported on April 19, 1960.

SwedenLANDINGS OF MACKEREL LIMITED BY POOR MARKET:

The Swedish and Danish markets as of early April were overstocked with mackerel with the result that Swedish fish export organizations have had difficulties in disposing of the landings. Accordingly, effective April 11, 1960, the quantity of mackerel that may be landed in Swedish ports was limited to 25 boxes containing 40 kilos or 88 pounds per man per trip.

Swedish fishermen have for some time caught unusually large quantities of mackerel in trawls in the northern part of the North Sea. This resulted in some fishermen preferring to land their catches in ports in England and Scotland. The mackerel now, however, are moving eastwards which means shorter trips for the fishing vessels from the fishing grounds to Swedish ports. Consequently, it is expected that fishermen will now prefer to land their catches in Swedish ports rather than English and Scottish ports.

A representative of the West Coast Fishermen's Central Society stated that it is difficult to explain the present situation. However, he said there is an evident buying resistance in the case of mackerel at this time of the year, because they do not have the same taste as during the summer months. (United States Consulate dispatch from Goteborg, April 7, 1960.)

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Sweden (Contd.):

RESEARCH VESSEL RESUMES
STUDIES ON SPAWNING OF
SPRING HERRING:

The Swedish fishery research vessel Eystrasalt left Lysekil on March 15, 1960, for a trip in the Skagerack to investigate the spawning of spring herring along the Swedish coast. Similar investigations have been performed yearly since 1951.

The survey includes water temperature, salinities, supply of plankton, etc. The research vessel will also contact Swedish fishing boats in the area, collecting samples of the herring. The expedition is headed by the Director of the Swedish Fish Laboratory at Lysekil. (United States Consulate dispatch from Goteborg, March 17, 1960.)



Union of South Africa

STEEL VESSEL OF NEW DESIGN FOR
PILCHARD FISHERY:

An all-welded steel vessel (Jakob S.) of unusual design for the pilchard fishery was launched in January 1960 by a Union of South Africa Cape Town shipyard. The vessel was scheduled to be fully completed in a few months.

In basic design and appearance, the vessel differs considerably from the conventional wooden vessel. With her deckhouse and engineroom right aft, she has an extremely spacious hold and, in capacity and performance, may introduce a new high standard to the South African West Coast inshore fishing fleet.

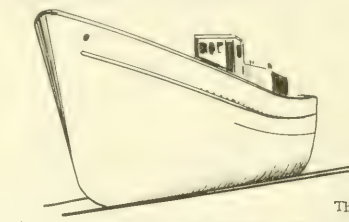
Designed by a South African naval architect, the vessel in size is slightly larger than the largest wooden vessel, measuring 64 ft. 8 in. between perpendiculars, 71 ft. over-all, 24 ft. molded breadth, and a draft of 10 ft. 3 in.

Her engineroom, situated right aft, is given ample space by the wide transom stern.

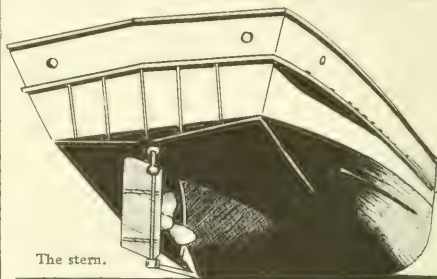
A marine Diesel engine, developing 210/230 b.h.p. at 375 r.p.m., has been

installed. The engine is equipped with a controllable pitch propeller.

In the Jakob S. the normal direct straight-line drive has been modified to meet the requirements for a fish hold of exceptionally large capacity.



The bow.



The stern.

The Jakob S., an all-welded steel vessel of unusual design to be used for pilchard fishing.

The controllable-pitch propeller will be hydraulically controlled direct from the wheelhouse, which is raised above the level of the deckhouse to give all-round vision.

Another feature of the Jakob S. is the provision of hydraulic steering and the first installation in a boat of this type of the hydraulic winch. (The South African Shipping News and Fishing Industry Review, February 1960.)



U. S. S. R.

FISHERIES IN EAST ASIATIC WATERS:

At the end of 1959 the fisheries in the Soviet Far East (including catching, processing, shipbuilding, and ship repairs) were placed under a central administrative organization, the newly-established

U. S. S. R. (Contd.):

Directorate for the Fishing Industry in the Far East, usually abbreviated to Glavdalvostokrybprom.

In an interview in Vodnyj Transport for February 9, 1960, the Director of the new agency stated that although it had only been a short time since fishery and fishing industry responsibilities had been transferred from the jurisdiction of the Far East's five regional economic councils to a central administration, it appeared the change was well liked. The reorganization has made it possible for more rational utilization, not only of the fishing fleet, but also of transport vessels, storage warehouses, processing plants, and port installations.

The further development of fishing in the Far East depends on a more intensive expansion of ocean fishing. The Pacific Ocean basin and the oceanic bays north of the Equator have the world's richest fishery resources, where Japan, China, the U. S. S. R., the United States, and Canada fish. The average catch is 7 million metric tons a year. The Soviet fleets have, until recently, conducted a limited fishery for flounders, cod, and fat herring in the waters off Kamchatka, Sakhalin, and the Russian Pacific Ocean coast. Now they are going farther at sea and taking bottomfish and deep-water fish. A large number of vessels are fishing in the southeasterly portion of the Bering Sea. But this is just a beginning. This year there have been set up 6 expeditions for catching various kinds of fish. They will operate in the South China Sea, the East China Sea, the Yellow Sea, the Gulf of Siam, the Bay of Tonkin, Bristol Bay, and the Gulf of Alaska.

In coming years the fisheries of the Far East will get a number of new large and medium trawlers, gill-netters, factoryships for processing herring, canning factoryships for crabs, freezer vessels, and refrigerator ships for transport of fishery products. (Norwegian fishery periodical Fiskets Gang, March 10, 1960.)

* * * * *

FISHING FLEETS NEED OFFICERS AND CREWS:

The vice chairman of the Soviet Murmansk Regional Economic Council has recommended the Murmansk fishing fleet as place of work, according to a report in Karasnaja Zvezda (January 19, 1960), the Defense Ministry's organ for the Soviet Union's Navy. He urged officers and crewmen who were about to go into the reserve to seek employment in the Murmansk fishing fleets where they would find good use for their talents and experience. A second mate in the fishing fleet could earn up to 3,000 rubles (about US\$300) a month.

According to an article in Sovjetskaja Estania on January 17, 1960, a former trawler captain and officer appealed to soldiers and officers, who were about to be demobilized, to seek work in the Estonian fishing fleet which is growing rapidly. (Fiskets Gang, March 24, 1960.)

Notes: Value converted at tourist rate of exchange of 10 rubles equal US\$1.



United Kingdom

BRITISH FIRM AGREES TO PURCHASE FROZEN FILLETS FROM FAROE ISLANDS:

An agreement for the purchase of all frozen cod and haddock fillets produced by the Faroese trawler owners has been signed by a British firm formed last year. It will be the first time Faroe frozen fillets have been available on the British market, and prices will remain steady even in times of fish shortage, according to a report in a London newspaper, The Guardian of March 7, 1960.

The fillets will be handled on behalf of the trawler owners by a freezing plant in Thorshavn. The freezing industry in the Faroes is still being developed, and refrigerated shipping is rather limited. Large supplies therefore will not be possible at first, but they will gradually increase. The first shipment is expected in August 1960.

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United Kingdom (Contd.):

**TRAWLERS TO SUPPLY FISH FOR
U. S. S. R. FROZEN FILLET CONTRACT:**

British distant-water trawler owners have entered into arrangements to supply a fish processing firm with ground-fish to execute contracts this company has concluded with Russia and Czechoslovakia. The contract calls for delivery of 2,500 tons of quick-frozen fillets during the summer. It is understood that the fish-processing firm hopes to complete the contract by the end of June.

Total contracts so far signed between the trawler owners and processors amount to 18,125 long tons. This quantity will be drawn from the fishing ports of Hull, Grimsby, and Fleetwood.

In addition to the above firm, two other processors have signed contracts with the trawler owners. (Fishing News, April 1, 1960.)

* * * * *

**FISHERY LOANS INTEREST RATES
INCREASED AS OF MARCH 11:**

The British White Fish Authority (WFA), as a result of a recent increase in the rates of interest charged to them by H. M. Treasury, increased their own rates effective March 11, 1960.

The new rates are:

On loans for not more than five years, 5 $\frac{3}{8}$ percent; increase $\frac{3}{8}$ percent.

On loans for more than five years but not more than 10, 5 $\frac{1}{2}$ percent; increase $\frac{1}{4}$ percent.

On loans for more than 10 years but not more than 15, 6 $\frac{1}{8}$ percent; increase $\frac{1}{8}$ percent.

On loans for more than 15 years, 6 percent; increase $\frac{1}{8}$ percent.

The new rates do not apply, however, where the final installments in current cases were paid by the Authority before March 14, 1960. The other terms and conditions of the Authority's arrangements for loans are unchanged.

The Authority's loans are connected with the building of new fishing vessels of not more than 140 feet, the purchase, in certain circumstances, of new engines and nets and gear for inshore vessels, the construction and equipment of processing plants, and the formation and development of cooperative organizations. (The Fishing News, March 18, 1960.)

* * * * *

NEW STERN TRAWLER PRAISED:

During a trip to the United Kingdom's west coast fishing grounds, which ended in March 1960, Aberdeen's new stern trawler Universal Star fished in very stormy weather when many of the standard trawlers had to give up.

The skipper stated that during a 12 days' trip in very bad weather they made 43 drags, and he had no complaints as the vessel was concerned. He believed that for comfort the Universal Star is far ahead of the standard type of trawler. As to seagoing qualities she is said to be steadier than the standard type, and ships no water, for even in the worst of weather it is only spray that comes over her stern.

The real trouble, however, since the vessel started operating late in 1959, has been with her fishing gear. It was found that the ordinary trawling gear as used by the standard trawler was not giving satisfactory results. Considerable adjustments had to be made, but now the skipper believes that they have gear which, given favorable weather conditions, will enable them to get good catches.

Apart from adjustments to the head rope, etc., smaller doors or trawl boards than with the standard gear are being used. The doors are approximately 7 ft. x 3 ft. 6 in., as compared with the standard 10 ft. x 4 ft. The boards used are also only about three-quarters of the weight of the standard type.

A representative of a Canadian firm, one of the largest concerns of its kind with a fleet of some 28 trawlers, visited Aberdeen especially to see the Universal Star. He appeared to be impressed with the vessel and with the idea of trawling

United Kingdom (Contd.):

over the stern instead of over the side.
(The Fishing News, March 18, 1960.)

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PERUVIAN FISH MEAL IMPORTS THREATEN INDUSTRY:

The President of the British Board of Trade has agreed to give consideration to the threat to the British fishing industry by the increasing imports of Peruvian fish meal.

Late in March, the President of the Association of Fish Meal Manufacturers, with other officers and members of the executive committee, met members of the all-party Parliamentary Fisheries' Committee at the House of Commons. The situation was explained to the Committee and the point of view of the British producers of fish meal was stated.

Later, the deputation, accompanied by members of the all-party committee, met with the President of the Board of Trade. It was explained that the amount paid for fish waste had fallen in a few months from £11 (US\$30.80) a ton to £6 (US\$16.80) and the reason was the great increase in Peruvian imports. (Fishing News, April 1, 1960.)



Venezuela

JAPANESE-VENEZUELAN TUNA. FISHING COMPANY PLANS ADDITION TO FLEET:

The Japanese-Venezuelan fishing venture (organized early in 1959) plans to purchase a 300-ton vessel in Japan to add to the present fleet of two 150-ton Japanese tuna vessels. Landings by the firm's two tuna vessels during the last

half of 1959 were valued at US\$130,556, according to a March 25, 1960, item in a Japanese newspaper.



Viet-Nam

FISHING FLEET INCREASED BY TWO NEW TRAWLERS:

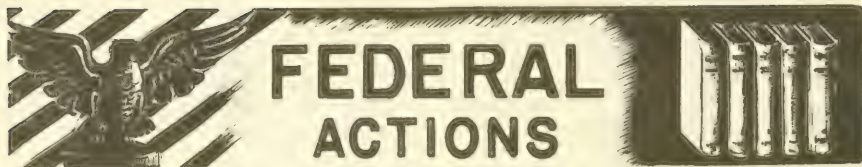
The Viet-Nam fishing company located in Saigon received two new 74-ton fishing trawlers during February 1960. Both were purchased from Japan under the commercial import program at a cost of two million piasters (about US\$51,143 at exchange rate of 35 piasters to US\$1) each.

Both vessels are equipped with cold-storage facilities, radar, and two-way radio to facilitate deep-sea operations out of the Port of Saigon. They were due to begin operations off the coast of Viet-Nam late in February with 14-man crews aboard each vessel. The owner and manager of the fishing company states that he expects each vessel should bring in 25-40 metric tons of fish each trip.

The Saigon fishing company operating the trawlers is the third large fishing company to be formed in Saigon. The other two are companies which have two vessels each and are averaging monthly catches of about 100-120 tons.

In a statement to the press, the fishing company's representative said that his firm, in cooperation with a Japanese engineer, is studying plans towards the establishment in 1961 of a dried fish and fish meal plant. (The United States Embassy, dispatch from Saigon, February 19, 1960.)





Department of Commerce

COAST AND GEODETIC SURVEY

FLEET SAILS TO CHART COASTAL WATERS:

The Coast and Geodetic Survey announced on April 5 that its fleet left various ports for 1960 season assignments. The endless assault by the forces of nature result in never-ending changes in the Nation's coastline; shoals and underwater deposits as well as recent wrecks are constant menaces to navigation. These changes must be located and together with new lights and buoys, must be shown on the Survey's charts.

During the 1960 field season, depending on the area and the weather, information will be gathered concerning depth, tides, currents, seawater-temperature, and salinity. Bottom samples will be obtained by coring, bathythermographs will record temperature against depth, and deep-sea reversing thermometers will be used.

Although the Survey has mapped more than 100,000 linear miles of coast since it was founded in 1807, some of the areas to be surveyed this summer in Alaska have never been charted in detail. Even along our much-traveled Atlantic coast threats to navigation are present.

Coast and Geodetic Survey ships may be distinguished by a flag which has a blue field carrying a white circle in which there is a red triangle. All vessels are painted haze gray. The uniforms of officers and crew resemble those of the U. S. Navy and U. S. Coast Guard, but are distinguished by Survey insignia.



Federal Trade Commission

CRAB FISHERMEN'S ASSOCIATION IN STATE OF WASHINGTON CHARGED WITH RESTRAINT OF TRADE:

The Federal Trade Commission on April 15, 1960, charged (complaint 7859, crabs) that a crab association in Westport, Wash., and its officers, trustees, and approximately 250 crab fishermen members, have unlawfully restrained competition in the \$2-million dungeness crab industry in the State of Washington.

The Commission's formal complaint alleges that since about 1958 they have used coercion in a conspiracy to prevent other dealers from buying or selling processed and unprocessed crabs and to get nonmember crab fishermen to join the association. The coercive methods allegedly used include threats of reprisals, intimidation, and physical violence.

Eleven members are named specifically in the complaint as trustees or officers who direct and control the association's activities and also as representative of the entire membership.

According to the complaint, the Association's main function is to fix prices paid by cannerys to members for their catch, and the "Membership Agreement" gives it the power to determine what cannerys and crab processors it and the members will deal with. Its members fish for fresh crabs in the coastal waters of Washington and Oregon and in the adjacent ocean. They account for almost the entire catch originating in the former state.

In May 1959, the complaint continues, about 90 of the some 250 association members formed a cooperative, and bought a crab-processing cannery. The cooperative competes with all other crab cannerys and processors in marketing its

products. Although the association and cooperative are legally distinct entities, all trustees and officers who control the former's actions are stockholders in the latter. Two are trustees of both organizations and one of these two is manager of the cooperative's cannery and crab-processing operations.

The complaint says the respondents have actual or potential power to monopolize all phases of the crab industry in their area since substantially the same men control the crab fishing fleet through the association, and own or control the cannery cooperative.

Respondents' monopoly power, coupled with the coercive tactics they have employed against other crab dealers and nonmember crabbers, tend to unlawfully destroy competition in fishing for, processing, shipping, selling, and marketing of processed or unprocessed crabs, the complaint charges.

These actions and conspiracy are unfair methods of competition forbidden by Sec. 5 of the Federal Trade Commission Act, the complaint concludes.

The respondents were granted 30 days in which to file answer to the complaint.



Department of Health, Education, and Welfare

FOOD AND DRUG ADMINISTRATION

ADDITIONAL PETITIONS FILED ON FOOD ADDITIVES:

In the April 8, 1960, Federal Register, the U. S. Food and Drug Administration announced the filing of the following petitions on food additives pursuant to the provisions of the Federal Food, Drug, and Cosmetic Act with reference to those sections dealing with food additives:

A petition has been filed by the Can Manufacturers Institute, Washington, D. C., proposing a regulation to provide

for the use of certain substances in the formulation of organic coatings for food containers coming in direct contact with food. Substances proposed were previously listed as being the subject of extension actions under section 121.87(d) of the Act and were published in the Federal Register of March 17.

A Columbus, Ohio, firm also filed a petition for a regulation permitting the use of sources of radiation to include certain radioactive isotopes producing radiations with energy levels not to exceed 2.2 million electron volts for the purpose of inspection of foods and food packages and for controlling food processes.

PETITION FILED FOR USE OF RESINS IN FOOD INDUSTRY:

A petition has been filed with the U. S. Food and Drug Administration by a Bartlesville, Okla., firm proposing the issuance of a regulation to permit the use of resins composed of (1) homopolymers of ethylene and (2) copolymers of ethylene and other 1-olefins in packaging, processing, packing, transporting or holding of foods. The notice appeared in the Federal Register of April 5, 1960.

USE OF SODIUM NITRITE IN CURED TUNA AND PET FOOD EXTENDED:

In an order signed by the Commissioner of the U. S. Food and Drug Administration, effective on March 29, 1960, the use of sodium nitrite was authorized "in Cured Tuna Fish (10 parts per million)" and "in canned pet animal food containing fish and/or meat (20 parts per million)" for a period of 1 year from March 6, 1960, or until regulations shall have been issued establishing or denying tolerances or exemptions from the requirement of tolerances, in accordance with section 409 of the act, whichever occurs first. The Food and Drug Administration states that this order has no bearing on any other variety of fish.



Department of Interior

FISH AND WILDLIFE SERVICE

SEASON FOR LAND-BASED WHALING FOR BALEEN WHALES CHANGED:

The six-months' season for land-based whaling for baleen whales by United States nationals and whaling enterprises has been changed by the Secretary of the Interior. The change, as it appeared in the Federal Register of April 6, 1960, shows the opening date of the season has been advanced two weeks and the closing date has been advanced two weeks. The new season for the taking or killing of blue whales or minke whales with a whale catcher attached to a land station is April 16 to October 15 following, both days inclusive.

The change was requested by the industry to take advantage of relatively better weather conditions during the early spring. Any resulting increase in the take of whales will be too small to affect significantly the conservation of the whale resources.



International Joint Commission (United States and Canada)

PASSAMAQUODDY TIDAL POWER PROJECT

PUBLIC HEARING:

The International (United States and Canada) Joint Commission conducted a public hearing on April 22, 1960, in Calais, Me., on the Passamaquoddy tidal power project. On August 2, 1956, the Governments of Canada and the United States had requested that the Commission make a joint examination and advisory report, including recommendations and conclusions.

The Commission was asked to determine the estimated cost of developing the international tidal power potential of Passamaquoddy Bay in the State of Maine and the Province of New Brunswick and whether or not hydroelectric power could

be produced at a price which is economically feasible. The Commission also was asked to determine the effects on the local and national economies, and to study specifically the effects which the construction, maintenance, and operation of the tidal power structures might have upon the fisheries of the area.



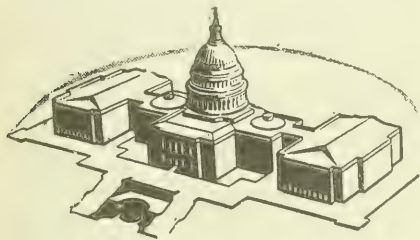
Passamaquoddy Tidal Power Project plan selected for detailed design.

Purpose of the hearing was to receive testimony and evidence on the findings and conclusions as contained in the reports of the International Passamaquoddy Engineering Board and the International Passamaquoddy Fisheries Board. The Fisheries Board has indicated in its report that the effect on the fisheries in Passamaquoddy and Cobscook Bays in Maine and New Brunswick will be only slight.



Eighty-Sixth Congress (Second Session)

Public bills and resolutions which may directly or indirectly affect fisheries and allied industries are reported. Introduction, referral to Committees,



pertinent legislative actions, hearings, and other actions by the House and Senate, as well as signature into law or other final disposition are covered.

CALIFORNIA FISHING PROBLEMS: Conference on Northern California Fishing Problems, House Document 370, 86th Congress Second Session, 90 pp., printed. This document is a transcript of a conference held at San Rafael, Calif., in November 1959. It constitutes a symposium of scientific papers and other expert testimony by some two dozen fishery scientists; state fish and game officials from Oregon, Washington, Idaho, and California; and U. S. Fish and Wildlife Service and Bureau of Reclamation officials as well as spokesmen for the commercial and sport fishing industries;-- on the responsibility of government, both State and Federal, to help conserve the valuable resource of the salmon and steelhead fisheries on the Pacific Coast.

COLOR ADDITIVES IN FOOD: The House Committee on Interstate and Foreign Commerce on April 5, 1960, held a scientific panel discussion on color additives in food. Related to S. 2197 (Hill and Goldwater), introduced in Senate June 17, 1959.

CHEMICAL PESTICIDES COORDINATION ACT: On May 3, 1960, the House Subcommittee of the Committee on Merchant Marine and Fisheries began hearings on H. R. 11502 (Wolf), a bill which was introduced in the House on March 31, 1960, to provide for advance consultation with the Fish and Wildlife Service and with State wildlife agencies before the beginning of any Federal program involving the use of pesticides or other chemicals designed for mass biological controls. On May 4, 1960, the hearings were concluded. Representatives of the Government and various public witnesses were heard. The U. S. Department of Agriculture and the U. S. Public Health Service opposed enactment of H. R. 11502 and the U. S. Fish and Wildlife Service proposed, in lieu thereof, an amendment to the Pesticide Research Act of 1958.

DISTRICT OF COLUMBIA FISH MARKET: S. J. Res. 144 (Beall) introduced in Senate on January 11, 1960, joint resolution to authorize the District of Columbia to erect a municipal fish market at the waterfront in Southwest Washington; to the Committee on the District of Columbia.

FAIR LABOR STANDARDS TRADE ACT: H. R. 11868 (Osterhag) introduced in the House on April 21, 1960, a bill to provide for adjusting conditions of competition between certain domestic industries and foreign industries with respect to the level of wages and working conditions in the production of articles imported into the United States, to the Committee on Ways and Means. This bill is similar in purpose to S. 2882, H. R. 9481, H. R. 10103, and H. R. 10887, but not identical.

FISH AND SHELLFISH CONSERVATION: S. J. Res. 184 (Magnuson), introduced in the Senate on April 7, 1960, a joint resolution to promote the conservation of ocean fish and shellfish; to the Committee on Interior and Insular Affairs. Public hearings were held by the Senate Subcommittee on Merchant Marine and Fisheries, May 13, 1960.

FISH AND WILDLIFE COOPERATIVE RESEARCH TRAINING UNITS: S. 1781 (Magnuson), a bill introduced in the Senate on April 23, 1959, was reported by the Committee on Interstate and Foreign Commerce on April 21, 1960 (Rept. No. 1285).

Senate Report No. 1285: Authorizing Continuation of Cooperative Unit Programs of Research and Education Relating to Fish and Wildlife (April 21, 1960, 86th Congress, 2nd. Session, report from the Committee on Interstate and Foreign Commerce to accompany S. 1781), 6 pp., printed. S. 1781, as amended, would continue the authority, now contained in appropriation acts, of the Secretary of the Interior to enter into cooperative agreements with colleges and universities game and fish departments of the States and territories, and with nonprofit organizations relating to cooperative research units. The function would be, among others, to conduct coordinated research by and between Federal, state, and private agencies; to provide for training primarily at graduate levels in the fields of fisheries and wildlife management; to maintain effective liaison between Federal, state, and private agencies relating to fish and wildlife resources of mutual interest and benefit to more than one state, including species of interest to citizens of States lacking them, and for other purposes wherein cooperative activities would offer benefits and promise of greater success at reduced costs.

The Senate on May 4 passed S. 1781 as amended. This is primarily a sport fisheries and wildlife bill. A wildlife spokesman stated the major purpose of this bill as "putting a statutory base" under the cooperative Federal-state wildlife education program which has been in effect for several years.

FISHERIES ASSISTANCE ACT OF 1959: On May 3, 1960, the Senate adopted a unanimous conference report of both Houses on H. R. 5421 (McDonald), a bill to provide a program of assistance to correct inequities in the construction of fishing vessels and to enable the fishing industry of the

United States to regain a favorable economic status, and for other purposes. On May 4, 1960, a conference report (Rept. No. 1589) and statement was filed. On May 5, 1960, Lausche filed a motion in the Senate to reconsider action of the Senate taken on May 3, in adopting conference report on H. R. 5421.

H. Rept. No. 1589, Providing a Program of Assistance for the Construction of Fishing Vessels (May 4, 1960, 86th Congress, Second Session, conference report from the Committee of Conference to accompany H. R. 5421), 7 pp., printed. The Committee of Conference on the disagreeing votes of the two Houses on the amendments of the Senate to the bill, agreed to and recommended Senate amendments that would require the vessels be suitable for defense purposes, aid in developing the U. S. fisheries, deliver their catch to U. S. ports, employ citizens of the United States or legally domiciled aliens, and be documented under U. S. laws. Section 4 of the House bill provides that a construction subsidy shall be granted under the act only to assist in the construction of a fishing vessel to be operated in a fishery suffering injury from which escape clause relief had been recommended by the Tariff Commission under the Trade Agreements Assistance Act of 1951, as amended, where such relief has been or is hereafter denied under section 7(c) of such Trade Agreements Assistance Act of 1951. The Senate amendment contained no comparable provision. The proposed conference substitute contains the same condition as provided in section 4 of the House bill with the addition that construction subsidies may also be granted to vessels to be operated in a fishery found by the Secretary to be injured or threatened with injury by reason of increased imports, either actual or relative, of a fish or shellfish product, not the subject of a trade agreement tariff concession, which is like or directly competitive with the fishery's product, and to vessels to be operated in a fishery found by the Secretary to be injured or threatened with injury by reason of increased imports, either actual or relative, of a fish or shellfish product that is provided for in the Free List of the Tariff Act of 1930, whether or not subject to a trade agreement tariff concession. Agreed to Senate amendments excluding the cost of defense features from the 3 1/2 percent construction subsidy, and to require that they be paid by the Department of Defense rather than Interior; and that plans for the vessels are to be submitted to Department of Defense for approval. The House authorized \$1 million to be appropriated annually; the Senate \$5 million--the Committee agreed upon \$2,500,000. The Committee accepted the Senate amendment which provided that no application for construction could be accepted after 3 years from the effective date. Contains statement of the managers on the part of the House.

HARBORS: Gulf Coast Shrimp Boat Harbors, Florida, House Document No. 183, 86th Congress, 1st Session (Letter from the Secretary of the Army transmitting a letter from the Chief of Engineers, Department of the Army, dated May 22, 1959, submitting a report, together with accompanying papers and illustrations, on a review of reports on and surveys of Gulf Coast shrimp boat harbors, Florida, requested by resolutions of the Committee on Rivers and Harbors, House of Representatives, and the Committee on Public Works, United States

Senate, adopted June 28, 1946, and February 14, 1950, also submitted in response to five other Congressional authorizations listed in the report), 45 pp., 2 charts, printed. Harbors reported on are Venice, Lemon Bay, Fort Myers Beach, and Naples.

Monterey Bay, California, House Document No. 219, 86th Congress, 1st Session (Letter from the Secretary of the Army transmitting a letter from the Chief of Engineers, Department of the Army, dated July 15, 1959, submitting a report, together with accompanying papers and an illustration, on a survey of Monterey Bay (Monterey Harbor), California, authorized by the River and Harbor Act, approved March 2, 1945), 107 pp., 1 chart, printed.

Snohomish River (Everett Harbor), Washington House Document No. 349, 82nd Congress, Second Session (Letter from the Secretary of the Army transmitting a letter from the Chief of Engineers, Department of the Army, dated January 27, 1960, submitting a report, together with accompanying papers and illustrations, on a review of reports on Snohomish River (Everett Harbor), Wash., requested by a resolution of the Committee on Public Works, House of Representatives, adopted July 19, 1956), 70 pp., 3 illustrations, printed.

INTERNATIONAL LABOR ORGANIZATION: Conventions and Recommendation Adopted by the International Labor Conference at Its Forty-Third Session at Geneva, House Document No. 365, 86th Congress, Second Session (Letter from the Assistant Secretary of State, dated March 30, 1960, transmitting texts of the following: (1) ILO Convention (No. 112) concerning the minimum age for admission to employment as fishermen, (2) ILO Convention (No. 113) concerning the medical examination of fishermen, and (3) ILO Recommendation (No. 112) concerning occupational health services in places of employment, adopted by the International Labor Conference at its forty-third session, at Geneva, June 19, 1959, pursuant to article 19 of the constitution of the ILO), 24 pp., printed. Contains statements by Federal agencies on and the texts of the conventions indicated.

HAWAIIAN OMNIBUS ACT: H. Report No. 1564, Amending Certain Laws of the United States in Light of the Admission of the State of Hawaii into the Union (May 2, 1960, 86th Congress, Second Session, report from the Committee on Interior and Insular Affairs to accompany H. R. 11602), 71 pp., printed. This bill, introduced April 6, 1960 (Inouye), amends certain laws of the United States in light of the admission of the State of Hawaii into the Union, and for other purposes. H. R. 11602 was introduced by Inouye after hearings on five predecessor bills H. R. 10434 (Aspinhill), H. R. 10443 (Inouye), H. R. 10456 (O'Brien), H. R. 10463 (Saylor), and H. R. 10475 (Westland). Includes the amendments agreed upon in committee when H. R. 10443 was marked up. All predecessor bills except H. R. 10443 were identical. Section 12 contains perfecting amendments to the statute, which authorizes the Secretary of the Interior to undertake exploration, investigation, development, and maintenance projects for fishery resources in the Pacific. Inappropriate references to the "Territory" of Hawaii and to the "Hawaiian Islands" would be deleted or modified by the amendments. Section 13 provides a perfecting amendment to section 2(d) of the Fish Restoration Act, to remove the definition of the term

"State." The term is defined by existing law to include the States and the Territory of Hawaii.

The Committee reported favorably on H. R. 11602, without amendment, and recommended that the bill be passed.

INTERIOR DEPARTMENT APPROPRIATIONS:

On May 2, 1960, the House disagreed to Senate amendments on H. R. 10401, a bill making appropriations for the Department of the Interior and related agencies for the fiscal year ending June 30, 1961, and for other purposes: agreed to a conference requested by the Senate, and appointed conferees.

On May 3, 1960, the House filed a conference report (Rept. No. 1571) on H. R. 10401 (Kirwin). Amendment No. 24 concerns the Bureau of Commercial Fisheries: Appropriations \$6,591,000 for management and investigations of resources instead of \$7,051,000 as proposed by the Senate and \$6,249,000 as proposed by the House. The increase provided over the House bill is for the following: Pesticides research; \$67,000; industrial fisheries research (menhaden, sardines, and herring), \$175,000; South Atlantic exploratory fishing and gear development program \$100,000. In addition, the conferees directed that \$60,000 be made available for this latter program from Saltonstall-Kennedy funds to make a total of \$160,000 available during fiscal year 1961. The \$400,000 recommended by Senate Committee on appropriations for tuna fisheries investigations was disallowed by the Conference Committee.

On May 5, 1960, the House adopted by a voice vote the conference report on H. R. 10401, and sent the legislation to the Senate. Two Senate amendments were reported in disagreement on which the House voted to recede and concur therein.

LAW OF THE SEA CONVENTIONS: On April 27, 1960, the Committee on Foreign Relations submitted favorable reports on four conventions and a protocol on the law of the sea (Executive Report 5), 86th Congress, 1st Session, as follows: Convention on the Territorial Sea, and the Contiguous Zone (Ex. J); Convention on the High Seas (Ex. K); Convention on Fishing and Conservation of the Living Resources of the High Seas (Ex. L); Convention on the Continental Shelf (Ex. M); and Optional Protocol of Signature Concerning Compulsory Settlement of Disputes (Ex. N), all signed on behalf of the United States at Geneva on September 15, 1958.

SALMON IMPORT RESTRICTIONS: Hearings by the Senate Subcommittee on Merchant Marine and Fisheries were held on May 13, 1960, on S. 502 (Bartlett, Gruening, and Magnuson), introduced into the Senate on January 29, 1959, a bill to facilitate the application and operation of the Fish and Wildlife Act of 1956, and for other purposes. Would prohibit the import of salmon products derived from fish caught by nationals of any country that permits fishing for salmon by gill nets on the high seas at times and places where occur large quantities of immature salmon of North American origin.

SEAWEED (GROUND, POWDERED, OR GRANULATED) ON FREE IMPORT LIST: On April 4, the President signed H. R. 5887 (Keith), a bill to

place ground, powdered, or granulated seaweeds on the free import list under Tariff Act of 1930 (P. L. 86-402).

SECOND SUPPLEMENTAL APPROPRIATIONS:

On April 5, 1960, conferees met and agreed to file a conference report on the differences between the Senate- and House-passed versions of H. R. 10743, second supplemental appropriations for fiscal 1960 (H. Rept. No. 1452). Includes for Fish and Wildlife Service Bureau of Commercial Fisheries an increase of \$55,000 to modify and improve docking facilities at Technological Laboratory, Pascagoula, Miss.

On April 6, 1960, the House adopted the conference report on H. R. 10743 by voice vote, and sent legislation to the Senate. April 7, 1960, the Senate adopted conference report and cleared for the White House. Bill was signed by the President April 13, 1960 (P. L. 86-424).

SHELLFISHERIES RESEARCH CENTER: H. R. 11515 (Gialmo), introduced in the House on April 4, 1960, a bill to provide for the construction of a shellfisheries research center at Milford, Conn.; to the Committee on Merchant Marine and Fisheries. The research center, estimated to cost \$1,325,000, would promote the culture of clams and oysters. Identical bills were introduced as follows: H. R. 11721 (Kowalski), introduced in House on April 12, 1960; S. 3392 (Bush and Dodd) introduced in Senate on April 20, 1960; and H. R. 11873 (Irwin), introduced in House on April 21, 1960.

SHRIMP IMPORT BILL: On March 28, the names of Senators Johnston (S. C.), Sparkman (Ala.), Thurmond (S. C.), and Byrd (Va.), were added as sponsors of S. 3204, a bill to amend Tariff Act of 1930 to provide for establishment of country-by-country quotas for importation of shrimp and shrimp products, to impose a duty on all unprocessed shrimp imported in excess of the applicable quota, and to impose a duty on processed shrimp and prohibit its importation in excess of the applicable quota.

STATE DEPARTMENT APPROPRIATIONS:

H. R. 11666 (Rooney), introduced in House on April 8, 1960, a bill making appropriations for the Departments of State and Justice, the Judiciary, and related agencies for the fiscal year ending June 30, 1961, and for other purposes; referred to the Committee on Appropriations. Reported on the same date (H. Rept. No. 1467) and referred to Committee of the Whole House on the State of the Union. A portion of the State Department appropriation is for the international fisheries commissions, which number nine this year, with the addition of the New Tortugas Shrimp Commission.

Department of State, and Justice, the Judiciary, and Related Agencies Appropriations for 1961 (Hearings before the Subcommittee of the Committee on Appropriations, House of Representatives, 86th Congress, Second Session), 1171 pp., printed. Contains budget estimates and testimony presented by witnesses and representatives of the Department of State and other agencies in connection with State Department appropriations for fiscal year 1961. Included are funds for the international fisheries commissions (pp.

1002-1109) to enable the United States to meet its obligations in connection with participation in nine such commissions (including the new Tortugas Shrimp Commission) pursuant to treaties of conventions, and implementing Acts of Congress.

H. Report No. 1467, Departments of State and Justice, the Judiciary, and Related Agencies Appropriations Bill, Fiscal Year 1961 (April 8, 1960, 86th Congress, Second Session, report from the Committee on Appropriations to accompany H. R. 11666), 29 pp., printed. Contains explanation of H. R. 11666. The sum of \$1,875,000 (a reduction of \$50,000 in the amount of the budget request, and an increase of \$150,000 over the appropriation for the present fiscal year), is included in the bill for international fisheries commissions. These funds are used for payment of the United States' share of the expenses of nine international fisheries commissions. The commissions conduct studies of determine measures necessary for the preservation and expansion of fishery stocks. In addition, the Halibut and Salmon Commissions regulate the fisheries under their jurisdiction, and in the Great Lakes that Commission carried on a lamprey control program. Included in the international fisheries commissions is the new Tortugas Shrimp Commission.

TARIFF NEGOTIATIONS: On May 6, 1960, Collier introduced in the House H. Con. Res. 687,

a concurrent resolution expressing the sense of Congress that the United States should not grant further tariff reductions in the forthcoming tariff negotiations under the provisions of the Trade Agreements Extension Act of 1958, and for other purposes; to the Committee on Ways and Means. This concurrent resolution is identical to H. Con. Res. 688 (Moeller), introduced in House on May 6, 1960, and about 32 other concurrent resolutions introduced in House and Senate January 25-May 6, 1960.

UNEMPLOYMENT RELIEF IN DEPRESSED

AREAS: On May 4, 1960, the chairman of the House Committee on Banking and Currency, called up for consideration S. 722 (Douglas and 38 other Senators, which was introduced in the Senate January 27, 1959, and passed March 23, 1959), a bill to establish an effective program to alleviate conditions of substantial and persistent unemployment and underemployment in certain economically depressed areas. A committee amendment was adopted that supplied new text for the Senate bill and recommended that this Act be known as the "Area Redevelopment Act." The new language would reduce the authorization to \$251 million in lieu of \$379,500,000.

On May 9, 1960, the Secretary of the Senate reported that he had presented S. 722 to the President for signature.



HERRING SEROLOGICAL SCOPE WIDENS

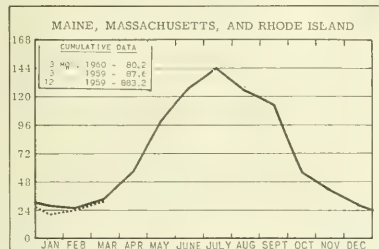
As part of the attempt at the Boothbay Harbor station of the U. S. Bureau of Commercial Fisheries to characterize herring populations serologically, recent work has been concentrated on a second blood group system in this species. During December 1959 a large sample of herring was collected from the New Jersey coast to explore this system more thoroughly. It appears to be analogous to the Rh system in humans in that there are several closely related cell antigens involved. It is hoped that with this new tool further information about the population structure of herring may be gained, once quantitative studies have been made.

Large numbers of blood samples from four other clupeoids in addition to herring were also obtained from the New Jersey coast, with which interspecies serological comparisons will be continued, to provide a basis for comparisons of intraspecies groups of herring. Working with cell antigens and serum proteins and using several techniques with each, a good picture has been obtained of the relationships of herring, shad, menhaden, alewives, and blueback, and a quantitative measure of the relative "serological distances" that separate each from the other, and this information will be of help in evaluating differences among herring populations.

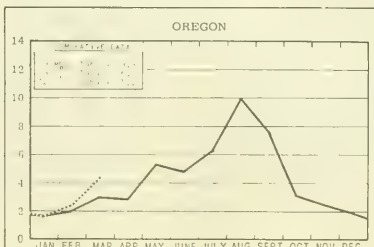
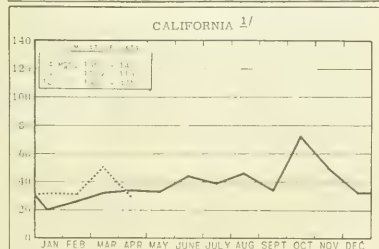
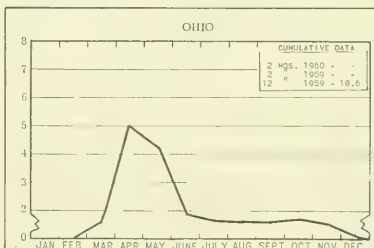
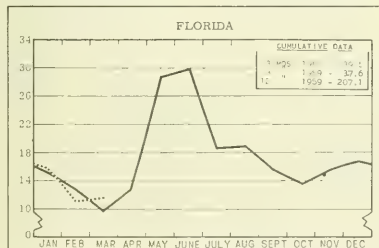
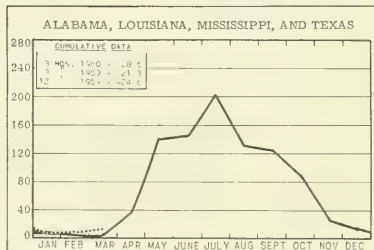
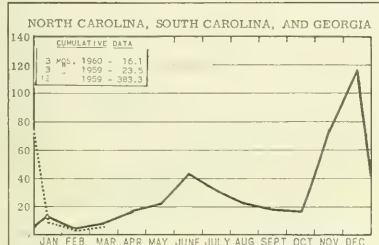
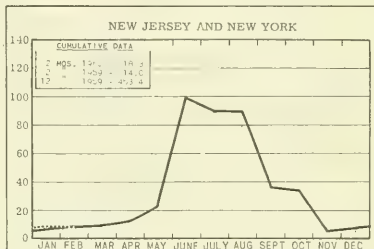


CHART 1 - FISHERY LANDINGS for SELECTED STATES

In Millions of Pounds



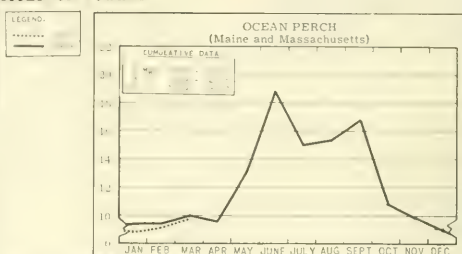
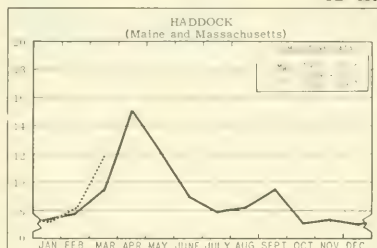
LEGEND:
..... 1959
———— 1960



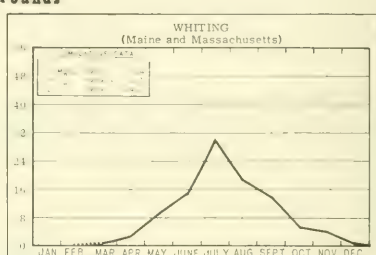
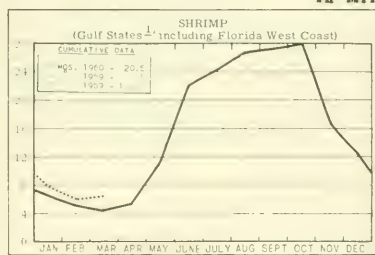
1/ONLY PARTIAL-INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH LANDINGS AT PRINCIPAL PORTS.

CHART 2 - LANDINGS for SELECTED FISHERIES

In Millions of Pounds

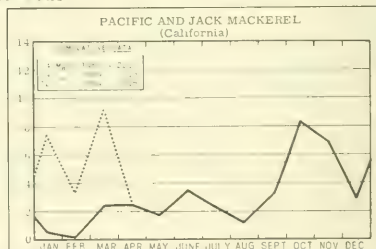
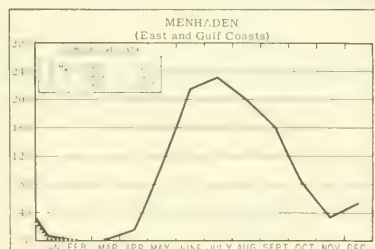


In Millions of Pounds



¹ - P. & S. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

In Thousands of Tons



In Thousands of Tons

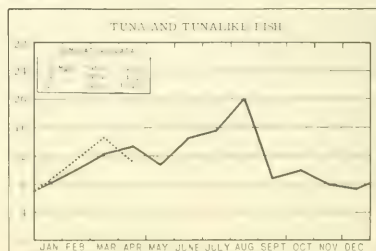
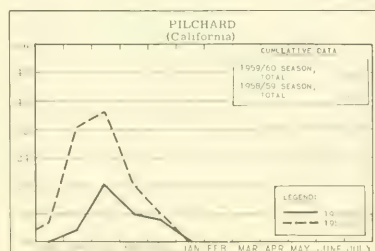
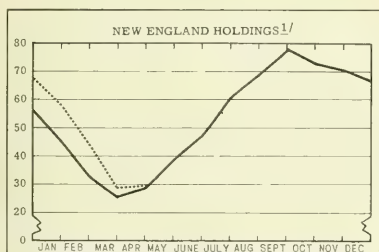
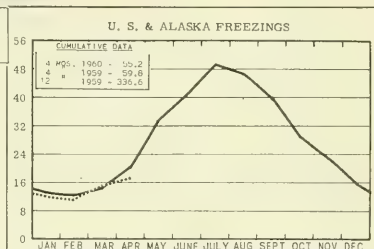
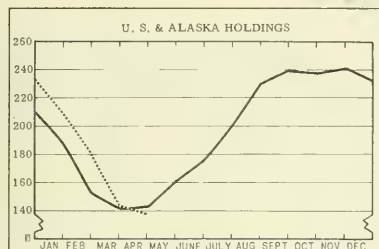
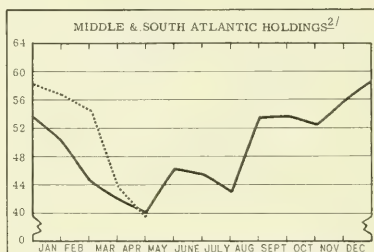


CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

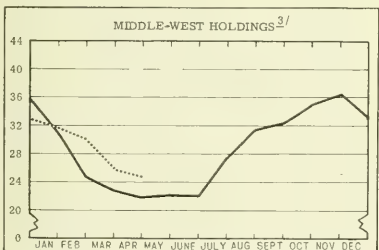
In Millions of Pounds



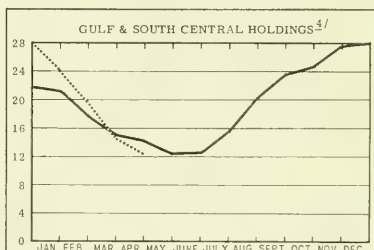
^{1/}MAINE, MASSACHUSETTS, RHODE ISLAND, AND CONNECTICUT



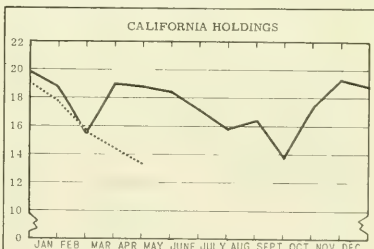
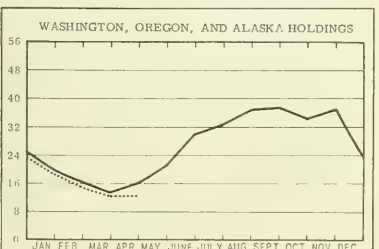
^{2/}ALL EAST COAST STATES FROM N. Y. SOUTH.



^{3/}OHIO, IND., ILL., MICH., WIS., MINN., IOWA, MO., N. DAK., NEBR., & KANS.



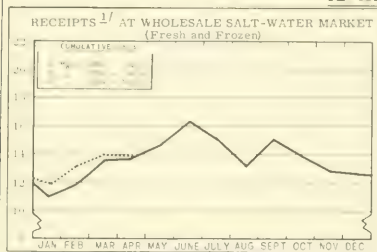
^{4/}ALA., MISS., LA., TEX., ARK., KY., & TENN.



* Excludes salted, cured, and smoked products.

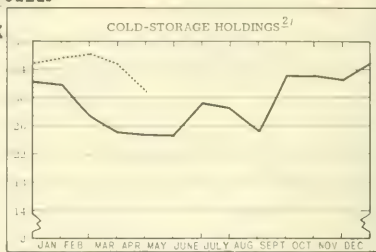
CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

In Millions of Pounds

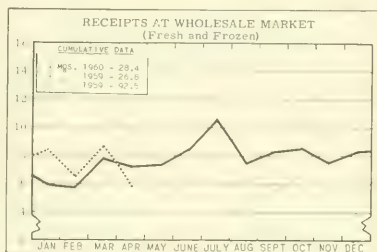


^{1/} INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.

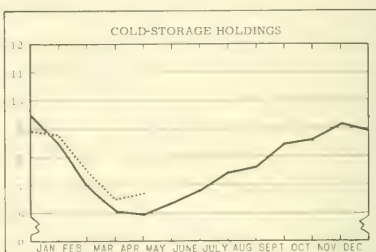
NEW YORK CITY



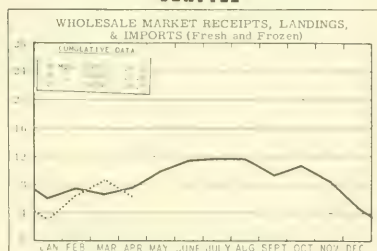
^{2/} AS REPORTED BY PLANTS IN METROPOLITAN AREA.



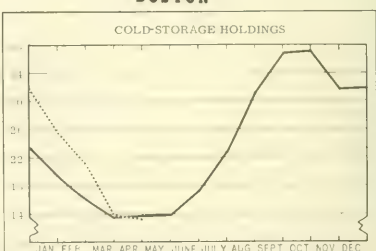
CHICAGO



SEATTLE



BOSTON



LEGEND
.....
————

CHART 5 - FISH MEAL and OIL PRODUCTION - U.S. and ALASKA

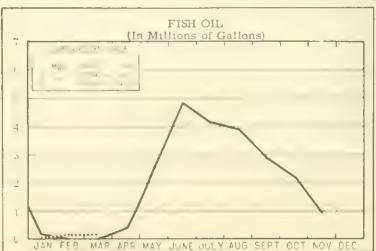
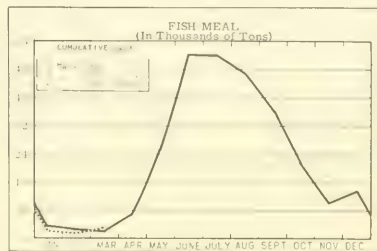
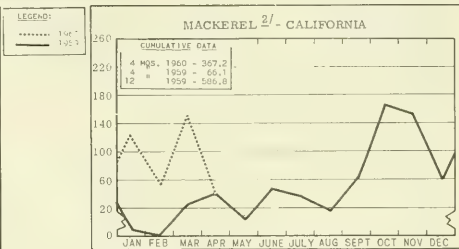
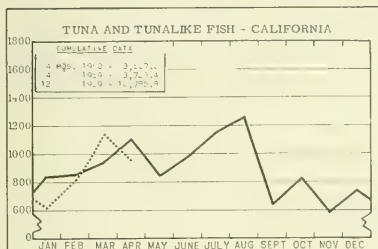
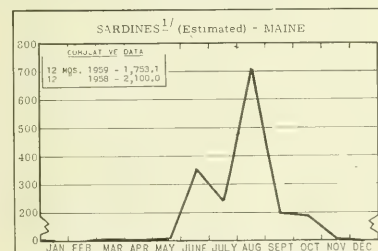
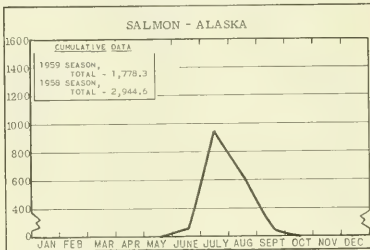
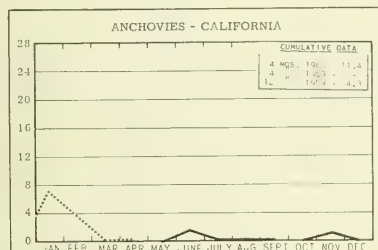


CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

In Thousands of Standard Cases



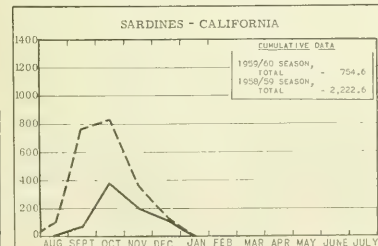
^{2/} INCLUDES PACIFIC MACKEREL AND JACK MACKEREL.



STANDARD CASES

Variety	No. Cans	Designation	Net Wgt.
SARDINES....	100	$\frac{1}{4}$ drawn	3 $\frac{1}{2}$ oz.
SHRIMP....	48	--	5 oz.
TUNA....	48	# $\frac{1}{2}$ tuna	6 & 7 oz.
PILCHARDS...	48	# 1 oval	15 oz.
SALMON.....	48	1-lb. tall	16 oz.
ANCHOVIES...	48	$\frac{1}{2}$ -lb.	8 oz.

^{1/} INCLUDING SEA HERRING.



LEGEND:
—— 1959/60
--- 1958/59

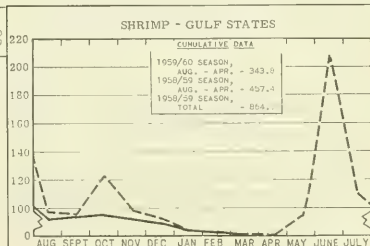
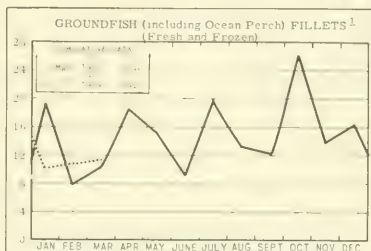
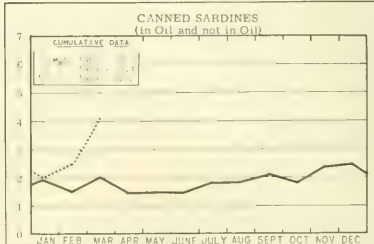
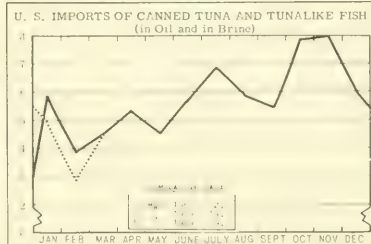
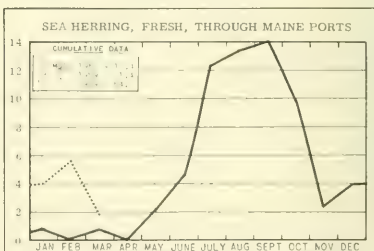
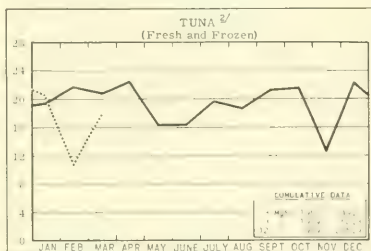
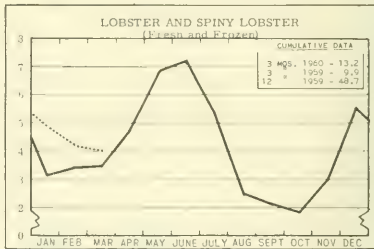
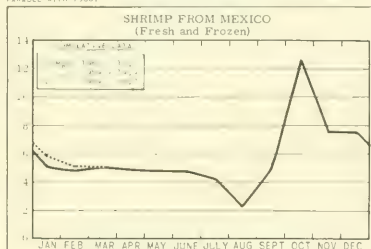
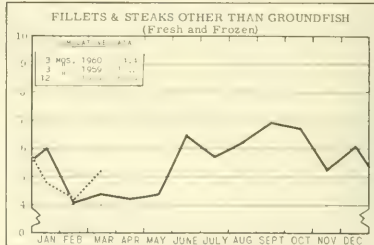


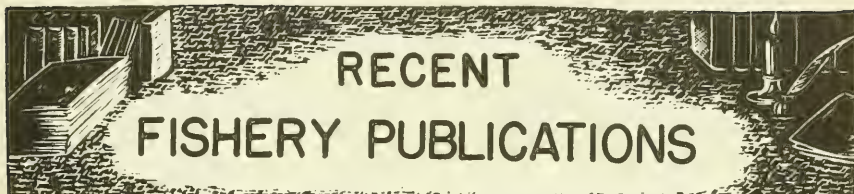
CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds



¹/SINCE SEPTEMBER 15, 1959, FISH FILLET BLOCKS ARE CLASSIFIED UNDER A DIFFERENT CATEGORY THAN FILLETS; THEREFORE, 1959 DATA ARE NO LONGER COMPARABLE WITH 1958.





FISH AND WILDLIFE SERVICE PUBLICATIONS

THE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

- CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
FL - FISHERY LEAFLETS.
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number	Title
CFS-2243	- Fish Meal and Oil, January 1960, 2 pp.
CFS-2245	- Massachusetts Landings, December 1959, 5 pp.
CFS-2247	- North Carolina Landings, 1959 Annual Summary, 6 pp.
CFS-2248	- Frozen Fish Report, February 1960, 8 pp.
CFS-2251	- Maine Landings, 1959 Annual Summary, 6 pp.
CFS-2253	- South Carolina Landings, 1959 Annual Summary, 4 pp.
CFS-2257	- Packaged Fish, 1959 Annual Summary, 5 pp.
CFS-2258	- Georgia Landings, 1959 Annual Summary, 4 pp.
CFS-2259	- Rhode Island Landings, 1959 Annual Summary, 7 pp.
CFS-2263	- California Landings, November 1959, 4 pp.
CFS-2267	- Rhode Island Landings, January 1960, 3 pp.
CFS-2269	- Mississippi Landings, December 1959, 2 pp.
CFS-2270	- New York Landings, January 1960, 4 pp.
CFS-2271	- Shrimp Landings, December 1959, 6 pp.
CFS-2272	- Fish Meal and Oil, February 1960, 2 pp.
CFS-2273	- Canned Fish and Byproducts, 1959 Annual Summary, 21 pp.
CFS-2274	- Texas Landings, January 1960, 3 pp.
CFS-2275	- Washington Landings, 1959 Annual Summary, 2 pp.
CFS-2276	- Virginia Landings, February 1960, 3 pp.
CFS-2277	- Maryland Landings, February 1960, 3 pp.
CFS-2278	- Louisiana Landings, October 1959, 2 pp.
CFS-2279	- South Carolina Landings, February 1960, 2 pp.
CFS-2280	- North Carolina Landings, February 1960, 3 pp.

CFS-2281	- California Landings, December 1959, 4 pp.
CFS-2282	- Mississippi Landings, 1959 Annual Summary, 3 pp.
CFS-2283	- Georgia Landings, February 1960, 2 pp.
CFS-2284	- Mississippi Landings, January 1960, 2 pp.
CFS-2285	- New Jersey Landings, February 1960, 3 pp.
CFS-2287	- Florida Landings, February 1960, 6 pp.
CFS-2288	- Maine Landings, February 1960, 3 pp.
CFS-2293	- Rhode Island Landings, February 1960, 3 pp.

FL No. 336rr - Commercial Fisheries Outlook, April-June 1960, 44 pp.

Sec. No. 587 - Processing and Quality Studies of Shrimp Held in Refrigerated Sea Water and Ice: Part 3 - Holding Variables and Keeping Quality of Raw Whole Shrimp.

Sec. No. 588 - Research in Service Laboratories (May 1960): Contains this article--"Technical Note No. 55 - Recommended Practices for Processing Chilled and Frozen Whiting."

Sec. No. 589 - Equipment Note No. 3 - New Diving Sled for Underwater Photography.

THE FOLLOWING MARKET NEWS LEAFLETS ARE AVAILABLE FROM THE BRANCH OF MARKET NEWS, BUREAU OF COMMERCIAL FISHERIES, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C.

Number	Title
MNL-13	- India's Fisheries.
MNL-16	- Shippers and U. S. Consignees of Peruvian Fish Meal Shipments, 1959.

THE FOLLOWING ENGLISH TRANSLATIONS OF FOREIGN LANGUAGE ARTICLES ARE NOT FOR GENERAL DISTRIBUTION BUT ARE AVAILABLE FOR REFERENCE ONLY FROM THE U. S. FISH AND WILDLIFE SERVICE, BUREAU OF COMMERCIAL FISHERIES, BIOLOGICAL LABORATORY, BOOTHBAY HARBOR, MAINE.

The Acclimatization of Lobsters in the U. S. S. R., by L. G. Vinogradov and A. A. Neyman, 7 pp., processed. (Translated from *Zoologicheskii Zhurnal*, vol. 38, no. 2, 1959, pp. 182-188.)

The Beginning of Active Feeding in Larvae of the Sakhalin Herring (CLUPEA HARENGUS PAL-ASI Val.), by I. V. Nikitinskaya, 4 pp., processed. (Translated from *Zoologicheskii Zhurnal*, vol. 37, no. 10, 1958, pp. 1568-1571.)

The Behavior of Fishes in an Electric Field and Their Protection during Hydraulic Construction, by L. M. Nusenbaum, 10 pp., processed. (Translated from *Trudy Soveshchaniy po Fiziolologii Ryb*, no. 8, 1958, pp. 132-141.)

- Blood Cells in Developing Salmon, by I. N. Ostroumova, 7 pp., processed. (Translated from Trudy Soveshchaniia po Fiziologii Ryb., no. 8, 1958, pp. 380-386.)
- On the Causes of the Similarity Between the Fauna in the Northern Parts of the Atlantic and Pacific Oceans, by L. S. Berg, 108 pp., processed. (Translated from Bulletin de l'Academie des Sciences de Russie (Russian), vol. 21, no. 8, May 1918, pp. 1835-1942.)
- Concerning the Systematic Position of the White Sea Herring, by A. I. Rabinerson, 2 pp., processed. (Translated from Annals of the State Institute for Experimental Agronomics, vol. 1, no. 3, 1923, pp. 106-107.)
- Conference on Problems Concerning the North Atlantic Herring Fisheries, 1 p., processed. (Translated from Rybnoe Khoziaistvo (Russian), vol. 34, no. 9, 1958, p. 94.)
- Data on the Fecundity of the Belomorsky Herring, by O. P. Antipova, 2 pp., processed. (Translated from Annals of the State Institute for Experimental Agronomics (Russian), vol. 6, no. 3-4, 1928, pp. 113-114.)
- Effect of Oceanographic and Meteorological Conditions on the Concentrations of Kandalaksha and Onega Herring, by V. M. Nadezhin, 15 pp., processed. (Translated from Zoologicheskii Zhurnal (Russian), vol. 38, no. 2, 1959, pp. 228-242.)
- The Fecundity of White Sea Herring, by E. A. Bezrukova, 5 pp., processed. (Translated from Zoologicheskii Zhurnal (Russian), vol. 17, no. 1, 1938, pp. 175-179.)
- The Fishery for Kilika (Sprat) with Fish Pump, Combined with Underwater Light and Impulse Current, by P. V. Nilonov and A. Kh. Patejev, 6 pp., processed. (Translated from Rybnoe Khoziaistvo, no. 7, June 1959, pp. 53-58.)
- Fishes' Reaction to Electric Current, by N. V. Bodrova and B. B. Krayukhin, 8 pp., processed. (Translated from Trudy Soveshchaniia po Fiziologii Ryb., no. 8, 1958, pp. 124-131.)
- Fluctuations in the Stock of Hokkaido Spring Herring, I--Mean Age Composition, by Tomokichi Yoshihara, 4 pp., processed. (Translated from Bulletin of the Japanese Society of Scientific Fisheries, vol. 19, no. 7, 1953, pp. 828-831.)
- Fluctuations in the Stock of Hokkaido Spring Herring, II--Net Reproduction Rate, by Tomokichi Yoshihara, 4 pp., processed. (Translated from Bulletin of the Japanese Society of Scientific Fisheries, vol. 19, no. 7, 1953, pp. 832-835.)
- Immunological Reaction in Fishes, B. G. Avetikyan, 6 pp., processed. (Translated from Trudy Soveshchaniia po Fiziologii Ryb. (Russian), no. 8, 1958, pp. 387-392.)
- Investigating the Blood of Mature Kura Salmon and Their Young, by B. M. Drabkina, 8 pp., processed. (Translated from Trudy Soveshchaniia po Fiziologii Ryb., no. 8, 1958, pp. 372-379.)
- Some Information on the Distribution of Mature and Immature Atlantic-Scandinavian Herring, by S. S. Fedorov, 4 pp., processed. (Translated from Fiskets Gang (Norwegian), no. 43, October 22, 1959, pp. 593-596.)
- The Secular Variation of the Total Length of Spring Herring CLUPEA HARENGUS C. et V. in the Western Coast of Hokkaido, by Hifotshi Kitahama, 6 pp., processed. (Translated from Bulletin of the Japanese Society of Scientific Fisheries (Japanese), vol. 21, no. 8, 1955, pp. 915-920.)
- On the Sprat's Reaction to Light, by A. A. Lovetskaya, 3 pp., processed. (Translated from Trudy Soveshchaniia po Fiziologii Ryb., no. 8, 1958, pp. 121-123.)
- On the Stock of Atlantic-Scandinavian Herring, by J. J. Marti, 4 pp., processed. (Translated from Fiskets Gang, no. 38, September 17, 1959, pp. 522-525.)
- On the Stock of Spring Herring in Hokkaido, by Morisaburo Tauchi, 3 pp., processed. (Translated from Bulletin of the Japanese Society of Scientific Fisheries, vol. 13, no. 5, 1948, pp. 207-209.)
- On the Variability of the Larvae of the Sakhalin Herring, by I. V. Nikitinskaya, 6 pp., processed. (Translated from Nauchnye Doklady Vyshey Shkoly, Biologicheskije Nauki (Russian), no. 4, 1958, pp. 31-36.)
- Standardizing Methods of Biological Research in the North Atlantic, by A. S. Polonskiy, 4 pp., processed. (Translated from Rybnoe Khoziaistvo, vol. 34, no. 9, 1958, pp. 6-9.)
- State of the Stock and Outlook for the Catches of Baltic Herring, by L. A. Rannak, 4 pp., processed. (Translated from Rybnoe Khoziaistvo, vol. 34, no. 10, 1958, pp. 13-16.)
- A Study of the Causes of Diurnal Vertical Migrations in Fishes, by S. G. Zusser, 6 pp., processed. (Translated from Trudy Soveshchaniia po Fiziologii Ryb., no. 8, 1958, pp. 115-120.)

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

Branch of Exploratory Fishing and Gear Research, Region 3 Activities, 17 pp., illus., processed. (Exploratory Fishing Base, U. S. Bureau of Commercial Fisheries, State Fish Pier, Gloucester, Mass.) Describes Bureau activities in exploratory fishing and gear research in the North Atlantic area. These activities are designed to facilitate the harvesting of our marine resources. Current knowledge of fish populations indicate that great as are landings in this area at present, they do not even approach the known limits of the resource. This booklet outlines the work of the Bureau's research vessels in locating new fishing grounds, estimating seasonal availability and migrations of commercial species, introducing more efficient methods of landing fish and shellfish, and developing new equipment. Several photos show scenes aboard the M/V Delaware during exploratory fishing trips.

California Fishery Products Monthly Summary, February 1960, 12 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) California cannery receipts of tuna and tunalike fish; mackerel, and anchovies; pack of canned tuna, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; American Tuna Boat Association auction sales; for the month indicated.

(Chicago) Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Market Prices, February 1960, 12 pp. (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces for fresh- and salt-water fish and shellfish; and wholesale prices for fresh and frozen fishery products; for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, March 1960, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 So. King St., Hampton, Va.) Fishery landings and production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly Summary for February 1960, 19 pp. (Market News Service, 155 John St., New York 38, N. Y.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, imports entered at New York City, primary wholesaler prices for frozen products, and marketing trends; for the month indicated.

Seattle and Astoria--Landings, Receipts, and Value of Fishery Products, 1959, by Charles M. Rear-don, 42 pp., processed. (Available free from the Market News Service, U. S. Fish and Wildlife Service, Pier 42, South, Seattle 4, Wash.) Reviews Pacific Northwest fisheries trends and their effect upon Seattle fishery products receipts for 1959; halibut landings; carload and truckload shipments of fishery products from Seattle by months; imports of canned fishery products at Seattle; and names, classifications, and standards as used on Seattle wholesale market. The Astoria section presents fisheries trends and products receipts for 1959; and landings and receipts of fishery products, 1959. The report also contains a number of statistical tables on fresh and frozen salmon receipts at Seattle, halibut landings, and ex-vessel landings by the otter-trawl fleet.

(Seattle) Washington, Oregon, and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, March 1960, 7 pp. (Market News Service, U. S. Fish and Wildlife Service, Pier 42 South, Seattle 4, Wash.) Includes landings and local receipts,

with ex-vessel and wholesale prices in some instances, as reported by Seattle and Astoria (Ore.), wholesale dealers; also Northwest Pacific halibut landings; and Washington shrimp landings; for the month indicated.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

AMINO ACIDS:

"Separation of Derivatives of Amino Acids by Using Gas-Liquid Chromatography," by E. Bayer, article, *Gas Chromatography*, 1958, pp. 333-339, printed. Gas Chromatography, Academic Press, Inc., 111 5th Ave., New York 3, N. Y.

ANTIBIOTICS:

"Determination of Antibiotic Residue in Fish," by Antonio Montefredine, Concetta Testa, and Imperia Morelli, article, *Bollettino dei Laboratori Chiamici Provinciali Bologna*, vol. 9, 1958, pp. 254-262, printed in Italian. Associazione Nazionale die Chiamici de C. N. A. Laboratori, Provinciali di Igiene e Profiassi, Via B. Triacchini 17, Bologna, Italy.

"Determination of Tetracycline in Fish Preserved with Antibiotic," by Antonio Montefredine, Imperia Morelli, and Concetta Testa, article, *Bollettino dei Laboratori Chiamici Provinciali Bologna*, vol. 9, 1958, pp. 263-267, printed in Italian. Associazione Nazionale die Chiamici de C. N. A. Laboratori, Provinciali di Igiene e Profiassi, Via B. Triacchini 17, Bologna, Italy.

The Use of Chlortetracycline in the Control of Spoilage in Ice-Stored Shrimp, by Mary H. Vance, William Saenz, and David L. Dubrow, Technical Series no. 28, 25 pp., illus., printed. State Board of Conservation, Tallahassee, Fla., June 1959. A report on experiments to determine the effect of CTC applied as a dip or incorporated into the storage ice in controlling shrimp spoilage and to develop suitable methods for the application of CTC under commercial fishing conditions. The pink shrimp (*Penaeus duorarum*) used in these experiments were obtained from a commercial shrimp vessel operating in the Tortugas area out of Key West, Fla. Results of the experiments indicate that shrimp treated with chlortetracycline will remain of acceptable quality for 4 to 7 days longer than non-treated shrimp.

ARGENTINA:

"La Industria Pesquero-Conservera Argentina" (The Argentine Fish-Canning Industry), article, *Industria Conservera*, vol. 25, no. 246, December 1959, pp. 328-330, printed in Spanish. Industria Conservera, Calle Marques de Valladarez, 41, Vigo, Spain.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

BAIT:

Artificial Bait for Blue Crabs, by William Saenz, David L. Dubrow, and William J. Cerniglia, Special Service Bulletin No. 16, 7 pp., printed, Florida State Board of Conservation, W. V. Knott Bldg., Tallahassee, Fla., July 1959. This booklet tells of two years of experimentation on the development of an artificial crab bait. None of the chemicals tested proved effective. A more successful approach was the use of natural products, such as brewers' yeast, fish preserved in formalin, and dry-salted fish. Traps baited with dry-salted fish caught between 80 and 90 percent as many crabs as those baited with fresh or frozen fish. In the course of the investigation it was found that a convenient way of baiting the traps is by placing the bait in an empty can in which holes have been punched on the sides and bottom. The bait in the can attracts crabs but is not consumed by the first individuals entering the trap. This device allows the use of smaller quantities of bait and preparation of the cans beforehand, so that less work is required on the boat.

BRITISH GUIANA:

The Trawl Survey Carried Out by the R/V CAPE ST. MARY Off British Guiana, 1957-59, Part I--Summary of the Survey, by W. G. Mitchell; Part II--The Interpretation of the Catch Records, by R. H. McConnell, Bulletin No. 2, 51 pp., illus., printed, BG\$1 (about 58 U. S. cents). The Fisheries Division, Department of Agriculture, Georgetown, British Guiana. Results of the survey outlined in this report indicate that trawling grounds extend out 30-40 miles from the coast of British Guiana, including an area of about 5,000 square miles. For best results, trawlers must have sufficient power to tow the trawl against wind and tide. Analysis of the catch showed that 200 species of fish were taken during the two-year survey. Of these, the principal species landed were the croaker, seatrout, and bangamary. The grounds have an average potential production of over 300 pounds of marketable fish per fishing hour throughout the year.

CANADA:

British Columbia Catch Statistics, 1959 (By Area and Type of Gear), 158 pp., illus., processed, Department of Fisheries, 1110 W. Georgia St., Vancouver 5, B. C., Canada, February 5, 1960. The ninth annual report of fish-catch statistics for British Columbia based on Departmental copies of sales slips that are completed by all commercial fish buyers operating within the Province. The following information is contained in this report: summary of landings by district and total landed value of all fish; highlights of catch statistics--a general review of fishing in each area; and detailed district and area monthly statistics by type of gear. Certain economic, weather, and conservation factors that have a bearing on the catch are also reviewed.

CARP:

"Elevage de la Carpe à Madagascar" (Carp Breeding in Madagascar), by A. Kiener, article, Bulletin de Madagascar, vol. 10, no. 165,

Februáry 1960, pp. 125-147, illus., printed in French. Bulletin de Madagascar, M. le Directeur de l'Imprimerie Officielle, Tananarive, Madagascar (Malgache Republic).

CEYLON:

"Ceylon Modernizes Her Fisheries", by I. V. MacDonald, article, Foreign Trade, vol. 113, no. 7, March 26, 1960, pp. 20-21, illus., printed, Queen's Printer, Government Printing Bureau, Ottawa, Canada.

CHEMICAL COMPOSITION:

"Sodium and Potassium in Salt-Water Fish", by Lennie M. Oglesby and Agnes C. Bannister, article, Journal of the American Dietetic Association, vol. 35, November 1959, pp. 1163-1164, printed, Journal of the American Dietetic Association, American Dietetic Association, 620 North Michigan Ave., Chicago 11, Ill.

"Variations in the Sodium and Potassium Content of the Muscle Tissue of Pacific Salmon with Particular Reference to Migration", by R. A. MacLeod, R. E. Jonas, and J. R. McBride, article, Canadian Journal of Biochemistry and Physiology, vol. 36, no. 12, December 1958, pp. 1257-1258, printed, Canadian Journal of Biochemistry and Physiology, National Research Council, Ottawa, Canada.

COLD STORAGE:

"Studies on a Jacketed Cold-Storage Room", by J. W. Slavin, J. A. Peters, and S. R. Pottinger, article, Food Technology, vol. 12, no. 11, November 1958, pp. 602-611, printed, Food Technology, The Garrard Press, 510 North Hickory, Champaign, Ill.

CONTAINERS:

"Cleaning Aluminum Fish Containers", by R. J. Nachenius, article, Annual Report, Fishing Industry Research Institute, no. 11, 1958, p. 13, printed, Fishing Industry Research Institute, University of Cape Town, Rondebosch, Union of South Africa.

DEHYDRATION:

"Vers des Applications Industrielles de la Cryo-Dessiccation à la Deshydratation des Produits Alimentaires" (Commercial Applications of the Freeze-Drying Process for Dehydration of Food Products), article, La Revue de la Conserve, no. 7, September 1957, pp. 67-68, printed in French, La Revue de la Conserve, 1 rue de la Reale, Paris 1, France.

DIETARY LEVELS:

Dietary Levels of Households in the West, Household Food Consumption Survey 1955 Report No. 10, 68 pp., illus., processed, 45 cents. U. S. Department of Agriculture, Washington, D. C., July 1957. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) The nationwide survey of household food consumption on which this report is based was made in April-June 1955 by the U. S. Department of Agriculture. Some data on dietary levels of fish and other high-protein foods are included. Fish is not shown separate-

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ly but appears in the combined category of "meat, poultry, fish."

DRYING:

"Continuous High Vacuum Drying Techniques," by P. Fixari, W. Conley, and G. Bard, article, *Food Technology*, vol. 13, March 1959, pp. 217-220, printed. Food Technology, The Garrard Press, 510 North Hickory, Champaign, Ill.

"Drying Fish and Beef Prior to Solvent Extraction," by L. K. Arnold, and Pong R. Hsia, article, *Journal of Agricultural and Food Chemistry*, vol. 6, no. 3, March 1958, pp. 231-232, printed. *Journal of Agricultural and Food Chemistry*, American Chemical Society, 1155 16th St., N. W., Washington 6, D. C.

ELECTRICAL FISHING:

"Die Verwendung von Leitungsstrom zur Elektrofischerei" (The Use of Direct Current for Electro-fishing), by H. W. Hattop, article, *Deutsche Fischerei Zeitung*, vol. 5, no. 9, September 1958, pp. 265-268, illus., printed in German. *Deutsche Fischerei Zeitung*, Neumann Verlag, Radebeul, Dresden, E. Germany.

"Wo Steht Gegenwärtig die Elektrofischerei?" (What is the Present State of Electrical Fishing?), by P. F. Meyer-Waarden, article, *Protokolle zur Fischereitechnik*, vol. 5, no. 22/23, October 1958, pp. 244-250, printed in German. Institut für Netzforschung, Hamburg, W. Germany.

EUROPEAN COMMON MARKET:

"L'Industrie de la Pêche Belge et l'Application du Marché Commun" (The Belgian Fishing Industry and the Effect of the Common Market), article, *La Pêche Maritime*, vol. 38, no. 981, December 1959, pp. 763-775, illus., printed in French. *La Pêche Maritime*, 190, Boulevard Haussmann, Paris (8^e), France.

"Les Pays du Marché Commun" (The Common Market Countries), article, *La Pêche Maritime*, vol. 39, no. 984, March 1960, pp. 147-149, printed in French. *La Pêche Maritime*, 190 Boulevard Haussmann, Paris, France. Includes sections on fishery developments in West Germany, Netherlands, Belgium, and Italy.

FISH-LIVER OILS:

Refined Shark-Liver Oil and Vitamin A Concentrates, by S. Mahdihassan and others, British Patent No. 810,643, March 18, 1959. Her Majesty's Patent Office, London, England.

FISH MEAL:

"Vergleichende Untersuchung Einiger Methoden zur Feststellung des Fett-Gehaltes in Fischmehl" (Comparative Investigation about Methods for the Determination of Fat in Fish Meal), by A. F. M. G. Luijpen, D. Hooghiemstra-Brasser, and A. C. Hindriks, article, *Fette, Seifen, Anstrichmittel*, vol. 60, no. 10, October 1958, pp. 10-12, printed in German. Industrieverlag von Hernhausen K. G., Hamburg 11, W. Germany.

FISH SAUSAGE:

"Les Saucisses de Thon," (Tuna Sausages), article, *La Pêche Maritime*, vol. 37, no. 965, August 1958, 1 p., illus., printed in French. *La Pêche Maritime*, 190 Boulevard Haussmann, Paris 8, France.

FISH SCRAP:

"Recovery of Blood and Fish Body Solids from Blood Water by a System of Heat Coagulation," by J. M. Fourie, article, *Progress Report No. 42*, 4 pp., printed. Fishing Industry Research Institute, University of Cape Town, Rondebosch, Union of South Africa.

FISH SOLUBLES:

"New Fish Solubles Plant Added to Cannery Operation," article, *Feedstuffs*, vol. 31, October 17, 1959, p. 46, printed. Feedstuffs, Miller Publishing Co., 118 S. 6th St., Minneapolis 2, Minn.

FLounder:

Young Plaice Hauls off the English East Coast, by R. S. Wimpenny, 22 pp., illus., printed, 6s. 6d. (about 91 U. S. cents). Her Majesty's Stationery Office, York House, Kingsway, London WC 2, England, 1960. (Reprinted from *Fishery Investigations*, series 2, vol. 23, no. 1.) Presents results of exploratory trawling for plaice (flounder) on grounds off the South Sands of Bridlington Bay between 1949 and 1958.

FLYINGFISH:

"Note on a Technique for Catching Flying Fish at Night," by John B. Lewis, article, *West Indies Fisheries Bulletin*, no. 6, November/December 1959, pp. 9-10, processed. Ministry of Natural Resources and Agriculture, Federal House, Port-of-Spain, Trinidad.

FOOD ADDITIVES:

Principles and Procedures for Evaluating the Safety of Food Additives, Publication 750, 12 pp., printed. National Academy of Sciences--National Research Council, 2101 Constitution Ave., Washington 25, D. C. A booklet on evaluating the safety of food additives which includes definitions of the terms food additives, toxicity, safety, and hazard; statement of principles as a guide to policy decisions in using additives; outlines of the kinds of investigation helpful in evaluating their safety; and principles for adapting an investigation to a particular additive and its expected use. The appendix discusses the functions of insignificant levels of chemical food additives.

"Some Pressing Problems Under the Food Additives Amendment of 1958," by Bernard L. Oser, article, *Food Technology*, vol. 13, November 1959, pp. 607-608, 609, printed. Food Technology, The Garrard Press, 510 North Hickory, Champaign, Ill.

What Consumers Should Know About Food Additives, Leaflet No. 10, 12 pp., illus., printed, 15 cents. U. S. Department of Health, Education, and Welfare, Food and Drug Administration,

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Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Included are sections on the history of the use of chemical preservatives; the contributions of food chemistry to better living; public health safeguards; and the latest legislation to regulate the use of food additives. Details are presented on the various types of additives such as vitamins, non-nutritive sweeteners, emulsifiers, and others; special classes of additives such as pesticides and coal-tar color; and requirements of label declaration when additives are used.

FOOD AND AGRICULTURE ORGANIZATION:

Technical Meeting on Fishery Cooperatives (Proceedings and Basic Working Papers), 228 pp., processed, limited distribution. Fisheries Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, December 1959. This, the first international meeting in its field, was held in Naples on May 12-21, 1959, and was co-sponsored by FAO and the International Labour Office. The report includes discussions and papers presented under the five agenda items and reprints of the four basic working papers commissioned for the meeting. The agenda items covered are: the Place of Cooperatives in the Economy of Fisheries; fishery Cooperatives and Government; Cooperative Education and Training in Fisheries; Organization and Management in Fishery Cooperatives; and general conclusions regarding fishery cooperatives and the future. The basic working papers deal with Fishery Cooperatives in Europe and North America; Education and Training for Fishermen's Cooperatives; and Business Organization and Management of Fishery Cooperatives.

FOOD CONSUMPTION:

Food Consumption and Dietary Levels of Households as Related to the Age of the Homemaker, United States--by Region, Household Food Consumption Survey 1955, Report No. 14, 134 pp., illus., processed, 75 cents. U. S. Department of Agriculture, Washington, D. C., 1959. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) This report, the latest in a series based on the 1955 Department of Agriculture's food consumption survey, shows that peak expenditures for food are made by families in which the housewife is between 30 and 50 years old. This is true for fish and shellfish as well as for other food products. Data on "fish and shellfish" as a separate category are included in the tables.

FOOD PRODUCTION:

Food Production for Home Use by Households in the United States--by Region, Household Food Consumption Survey 1955, Report No. 12, 88 pp., illus., processed, 75 cents. U. S. Department of Agriculture, Washington, D. C., 1958. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) This report, the twelfth in a series based on data gathered during a 1955 survey on household consumption, was prepared jointly by the

Agricultural Research Service and the Agricultural Marketing Service. Six thousand homemakers in the United States were interviewed. Information given on quantities and money value of foods used during the week preceding the interview was used in preparing the present report. Category of meat and poultry includes fish and game, but the latter two are not shown separately in any of the tables.

FOREIGN TRADE:

21st Annual Report of the Foreign-Trade Zones

Board (to the Congress of the United States), 16 pp., printed, 15 cents. Foreign-Trade Zones Board, U. S. Department of Commerce Bldg., Washington 25, D. C., October 1959. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Annual report of the Foreign-Trade Zones Board for the fiscal year ended June 30, 1959, together with the reports covering operations during the same period of Foreign-Trade Zones located at New York, New Orleans, San Francisco, and Seattle.

FREEZING AND CANNING:

Home Freezing and Canning by Households in the United States--by Region, Household Food Consumption Survey 1955, Report No. 11, 72 pp., illus., processed, 45 cents. U. S. Department of Agriculture, Washington, D. C., 1957. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) The eleventh in the series of reports based on data gathered during the 1955 Household Food Consumption Survey conducted by the Department of Agriculture during the spring of 1955. Some data on preservation of fishery products in the home are included. Fish is not shown separately but appears in the combination category of "meat, poultry, fish or game."

FREEZING EQUIPMENT:

"Freezing Plant Aboard Factory Ships and Trawlers," by M. B. F. Ranken, article, Modern Refrigeration, vol. 61, no. 12, December 1958, p. 1234, printed. Modern Refrigeration, Maclaren House, 131 Great Suffolk St., London SE1, England.

FROZEN FOODS:

"The AFDOUS Code--A Review of Recommended Sections," article, Frosted Food Field, Vol. 29, October 1959, pp. 84-85, printed. Frosted Food Field, 321 Broadway, New York 7, N. Y.

GENERAL:

Color-Coding in Small Plants, by Joseph deFeher, Technical Aids for Small Manufacturers No. 69, November-December 1959, 4 pp., illus., printed. Small Business Administration, Washington 25, D. C. Several ways that color-coding can raise general industrial efficiency and bring about orderliness are highlighted in this leaflet. Recent improvements made possible by standardization of the color-coding system are reviewed. The uses of

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colors for purposes such as safety measures, and marking of critical areas on machines, piping systems, resistors, temporary hazards, and dangerous substances are described.

GHANA:

Report of the Fisheries Division, Ministry of Food and Agriculture, 1958, 21 pp. and 5 charts, illus., printed, 3s. 6d. (about 49 U. S. cents). Government Printing Department, Accra, Ghana, 1960. Covers developments in sea fisheries, fishing harbors for power craft, fishing operations, freshwater fisheries, and the fisheries school, during 1958. In May of that year, the one hundredth motor fishing vessel to be registered in Ghana was launched.

HERRING:

The Herring of the Clyde Estuary, by Henry Wood, Scottish Home Department Marine Research No. 1, 1960, 24 pp., illus., printed, 8s. 6d. (about US\$1.19). Her Majesty's Stationery Office, 13A Castle St., Edinburgh 2, Scotland.

"Smasildundersøkelsen i Nord-Norge med F/F Asterias hosten 1959" (Exploratory Fishing for Small Herring in Northern Norway with the Vessel *Asterias* during 1959), by Per Hognestad, article, *Fiskets Gang*, vol. 46, no. 4, January 28, 1960, pp. 53-59, illus., printed in Norwegian. *Fiskets Gang*, Postgiro nr. 691 81, Bergen, Norway.

ISRAEL:

Fishermen's Bulletin, vol. 3, no. 2 (22), December 1959, 36 pp., illus., printed in Hebrew with English abstracts. Fishermen's Bulletin, P. O. B. 609, Haifa, Israel. Includes, among others, these articles: "Refrigeration Processes in Fishing Vessels," by M. Bleiser; "Transport and Marketing of Red Sea Fish," by I. Ziskin; "Israeli Shrimp and Ink-Fish Exports in 1959;" and "Sardine Fishery in 1959," by Y. Arlav.

JAPAN:

Journal of the Tokyo University of Fisheries, vol. 45, no. 1, March 1959, 94 pp., illus., printed. The Tokyo University of Fisheries, Shiba Kaigandori 6, Minato-ku, Tokyo, Japan. Includes, among others, articles on: "A Biological Study on a Japanese Edible Mantis-Shrimp, *Squilla oratoria* De Haan," by I. Kubo and others; "Zoogeographical Studies on the Demersal Fishes of the Tokyo Bay," by K. Takagi; and "Studies on the Fat Metabolism of Fish. 2--Histological and Chemical Studies on Fat and Phosphorous in Rainbow Trout," by T. Ono and others.

Journal of the Tokyo University of Fisheries, vol. 45, no. 2, March 1959, 137 pp., illus., printed. The Tokyo University of Fisheries, Shiba Kaigandori 6, Minato-ku, Tokyo, Japan. Includes articles on: "Polarographic Studies of Protein Contained in Aquatic Animal," by T. Kikuchi, T. Hirano, and I. Okada; "Studies on the Fat Metabolism of Fish. III--Relations Between Fat and Phosphorous in Rainbow Trout," by T. Ono and F. Nagayama; "Enzymatic Studies on the Glycolysis of Fish Muscle. II--Colorimetric Method for Determination of Sugars in Muscle," by F. Nagayama and

others; "Study on the Fish-Gathering Effects of Air Curtain," by Y. Imamura and M. Ogura; "Study on the Disposition of Fish Towards Light. III--The Strength of Illumination Comfortable to *Cololabis saira*," by Y. Imamura and A. Koike; "Study on the Disposition of Fish Towards Light. IV--The Strength of Illumination Comfortable to Mackerel and *Trachurus japonicus*," by Y. Imamura; "Study on the Response of *Trachurus japonicus* to Air-Bubbles," by Y. Imamura and M. Ogura; and "Determination of Time Required for Freezing of Skipjack," by K. Tanaka and J. Nishimoto.

Technical Report of Fishing Boat, No. 13, 123 pp., illus., printed in Japanese with English abstracts. Fishing Boat Laboratory, Fisheries Agency, Ministry of Agriculture and Forestry, Kasumigaseki, Chiyodaku, Tokyo, Japan, October 1959. Contains, among others, these papers: "Resistance Test of European Wooden Trawler (No. 2)," by N. Yokoyama and T. Kobayashi; "Self-Propulsion Test with European Wooden Small Trawler Models," by N. Yokoyama and E. Imanari; "Results of Measure Experiments by Several Meters on Net Shape of One-Boat Trawl Net (Danish Seine Net)," by C. Hamuro; "Study on Ultrasonic Waves Reflection Loss at Fish-Body Examination on Dimension of Fish-Body and Wave-Length," by Y. Maniwa; "Comparison between the Echo-Trace of Sea-Bottom by the 14 kc. Echo-Sounder and that by the Echo-Sounder of Ultra High Frequency Sound-Wave Which Has the Same Mechanism as the 14 kc. Echo-Sounder," by T. Hashimoto, Y. Maniwa, and M. Nishimura; "Detection of Fish by Sonobuoy," by T. Hashimoto, M. Nishimura, and Y. Maniwa; and "Technical Examination and Tentative Making of Fish-Finder for Tuna and Experiment on It on Sea," by T. Hashimoto and Y. Maniwa.

JELLYFISH:

"The Portuguese Man-of-War," by Charles E. Lane, article, *Scientific American*, vol. 202, no. 3, March 1960, pp. 158-168, illus., printed. Scientific American, Inc., 415 Madison Ave., New York 17, N. Y.

LAW OF THE SEA:

"La Deuxieme Conference de Geneve Etablira-t-elle une Regle Universelle d'Etendue de la Mer Territoriale et de la Zone Contigue?" (Will the Second Conference at Geneva Establish a World-Wide Law to Extend the Territorial Sea and Contiguous Zone?), article, *La Pêche Maritime*, vol. 39, no. 984, March 1960, pp. 129-132, printed in French. *La Pêche Maritime*, 190 Boulevard Haussmann, Paris, France.

Second United Nations Conference on the Law of the Sea (Synoptical Table Concerning the Breadth and Juridical Status of the Territorial Sea and Adjacent Zones), A/CONF. 19/4, February 8, 1960, 14 pp., printed. United Nations International Documents Service, Columbia University Press, 2960 Broadway, New York 27, N. Y.

MACKEREL:

"Line Fishery for Mackerel," by C. Nedelec, article, *Science et Pêche*, no. 63, October 1958,

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

4 pp., printed in French. Science et Pêche, L'Institut Scientifique et Technique des Pêches Maritimes, 59 Avenue Raymond-Poincaré, Paris 16^e, France.

MUSSELS:

"Nebennutzungen in der Binnenfischerei: Muschelverwertung" (Secondary Exploitation in the Fresh-Water Fishery: Mussel Fishing), by B. Rogge, article, Deutsche Fischerei Zeitung, vol. 5, no. 9, September 1958, pp. 279-281, illus., printed in German. Deutsche Fischerei Zeitung, Neumann Verlag, Radebeul/Dresden, E. Germany.

NETS:

"Bisherige Erfahrungen mit Netzen aus Chemisch Veränderter Baumwolle" (Experience to Date With Nets Made of Chemically-Treated Cotton), by A. von Brandt, article, Wissenschaftliche Informationen für die Fischereipraxis, vol. 5, no. 4, July/August 1958, pp. 118-122, printed in German. Bundesforschungsanstalt für Fischerei, Hamburg 36, W. Germany.

"The Effect of Dyeing on the Efficiency of Gill Nets and Long Lines Made of Perlon Monofilament," by G. Kajewski, article, Fischereiforschung, vol. 1, no. 1, August 1958, p. 19, printed in German. Fischereiforschung, Institut für Hochseefischerei und Fischverarbeitung, Rostock-Marienehe, E. Germany.

"Tabellen zur Gewichtsrechnung von Baumwollnetzen unter Berücksichtigung eines Einstellungsverhältnisses" (Tables for Calculating the Weight of Cotton Nets Under Consideration of a Certain Hanging Coefficient), by K. Schmidt and K. Auwand, vol. 5, no. 4, April 1958, pp. 100-104, printed in German. Deutsche Fischerei Zeitung, Neumann Verlag, Radebeul/Dresden, E. Germany.

NORTHERN RHODESIA AND NYASALAND:

(Joint Fisheries Research Organisation) Annual Report No. 8, 1958, 61 pp. and 2 maps, illus., printed, 5s. (about 70 U. S. cents). Joint Fisheries Research Organisation, Salisbury, Rhodesia, 1959. This is the eighth report by the Joint Fisheries Research Organisation of Northern Rhodesia and Nyasaland but the first appearing as a separate publication. The seven previous reports were incorporated into the annual reports of the Game and Tsetse Control Departments in each territory. The present summary covers activities of the Organisation in Northern Rhodesia, such as development of Lake Bangweulu and its swamp fishery, progress of the Zambezi Valley surveys, and operation of the Flyongole Fish Farm. Also describes activities of the Organisation in Nyasaland during 1958, such as investigations of distribution of fish larvae, hydrology and plankton, and the fishes of Lake Nyasa. Includes four papers on fisheries of the region and a list of publications by members of the Organisation.

NORWAY:

Fylker og Landsdele i Norge, Statistisk Belyst, (Statistical Report on Counties and Land Area in Norway), by Hans Luhn, 69 pp., illus., printed in Norwegian. Arbeidsdirektoratet, Oslo, Nor-

way, December 1958. A report covering statistical data on industry, agriculture, commerce, health, climatic conditions, and other aspects of life in the Norwegian counties. Includes a chapter on fishing, with details of volume and value of catch by species for coastal and distant-water fisheries.

OREGON:

Research Briefs, vol. 7, no. 1, July 1959, 82 pp., illus., printed. Fish Commission of Oregon, 307 State Office Bldg., Portland 1, Oreg. Contains, among others, articles on: "Time of Spawning, Length of Maturity, and Fecundity of the English, Petrale, and Dover Soles (Parophrys vetulus, Eopsetta jordani, and Microstomus pacificus, respectively)," by George Y. Harry, Jr.; and "The 1955-1956 Silver Salmon Run Into The Tenmile Lakes System," by Alfred R. Morgan and Kenneth A. Henry.

POISONOUS FISH:

"Poisonous Fishes in the Caribbean Area," by A. C. Ellington, article, West Indies Fisheries Bulletin, no. 6, November/December 1959, pp. 1-5, processed. Ministry of Natural Resources and Agriculture, Federal House, Port-of-Spain, Trinidad.

PRESERVATION:

"Nouvelles Methodes de Conservation du Poisson" (New Methods of Fish Preservation), article, La Pêche Maritime, vol. 37, no. 961, April 1958, 1 p., printed in French. La Pêche Maritime, 190 Boulevard Haussmann, Paris 8, France.

PROTEINS:

Dehydrated Edible Fish Proteins, by Raimund Vogel and Klement Mohler, U. S. Patent No. 2,875,061, Feb. 24, 1959. U. S. Patent Office, Washington 25, D. C.

REFRIGERATED VESSELS:

"The Chilling and Storage of Fish on Refrigerated Trawlers," by G. Konokotin, article, Kholodil'naia Tekhnika, no. 6, 1959, pp. 24-28, illus., printed in Russian with brief English summary. Kholodil'naia Tekhnika, c/o Four Continent Book Corp., 822 Broadway, New York 3, N. Y.

SALMON:

"The Earliest of Salmon," by William B. Currie, article, Scotland, vol. 4, no. 3, March 1960, pp. 45-47, illus., printed. 1 Castle St., Edinburgh 2, Scotland. A short description, for anglers, of the spawning habits of and best spots for catching the early-running Atlantic salmon in Scotland's rivers and lakes.

"Zur Technologie des Lachsfanges" (Technology of Salmon Fishing), by J. Zaucha and G. Kajewski, article, Fischereiforschung, vol. 1, no. 2, September 1958, pp. 1-7, illus., printed in German. Fischereiforschung Institut für Hochseefischerei und Fischverarbeitung, Rostock-Marienehe, E. Germany.

SANITATION:

"Up-To-Date Sanitation Processes," by W. J. Dixon, article, Canner and Freezer, no. 126,

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June 1958, pp. 18-20, printed. Canner and Freezer, 105 W. Adams St., Chicago 3, Ill., U. S. A.

SARDINES:

"Sardine Cannery's Program Hits Top-Quality Bull's-Eye," by Arthur V. Gemmill, article, *Food Engineering*, vol. 32, no. 3, March 1960, pp. 78-81, illus., printed. Food Engineering, McGraw-Hill Publishing Co., Inc., 330 W. 42nd St., New York 36, N. Y. Describes how Maine sardine processors are going "all out" to finance quality control and inspection services. They have adopted mandatory grading that almost completely eliminates any sub-standard products. A good deal of money is being spent on research and promotion. "Sardines from Maine" are becoming a familiar item on food store shelves throughout the country.

SEALS:

An Attempt Towards a Revision of the Systematics and Diagnostic Features of Seals Belonging to the Subfamily PHOCINAE, by K. K. Chapskii, translation no. NRCC C-2330, 10 pp., processed. (Translated from Trudy Zoologicheskogo Instituta, Akademiya Nauk SSSR, vol. 17, 1955, pp. 160-169.) SLA Translation Center, The John Crerar Library, 86 E. Randolph St., Chicago 1, Ill.

SHRIMP:

The Tortugas Shrimp Fishery: The Fishing Fleet and Its Method of Operation, by E. S. Iversen and C. P. Idyll, Technical Series No. 29, 37 pp., illus., printed. State Board of Conservation, Tallahassee, Fla., June 1959. This report gives the background for the establishment of a measure of the relative quantities of pink shrimp (*Penaeus duorarum*) on the Tortugas grounds, within seasons and between seasons. It describes the fleet engaged in the Tortugas pink shrimp fishery and includes data on the size and age of vessels in the fleet, vessel activity (i.e., fishing and selling practices), landings by day of the week, and length of fishing trips. Also described are mesh size of trawl nets, changes in the gear used, average size of shrimp landed, amount of small shrimp discarded, variation in the hours of darkness; occurrence of jellyfish and algae on the grounds, strength and direction of the wind, phases of the moon, and the regulation of fishing. These are described and considered in relation to their effect on estimates of catch per unit of effort.

SPINY LOBSTER:

"Le Conditionnement sous Vide des Queues de Langoustes a Bord du Langoustier-Congelateur Francoise-Christine" (The Processing Plant for Spiny Lobster Tails on Board the Freezer Vessel Francoise-Christine), article, *La Pêche Maritime*, vol. 39, no. 984, March 1960, pp. 156-157, illus., printed in French, *La Pêche Maritime*, 190 Boulevard Haussmann, Paris, France.

STANDARDS:

"Use of Grade Standards in the Quality Control of Fishery Products," by Mary E. Ambrose and Maurice Bender, article, *Food Technology*, vol. 13, May 1959, pp. 249-251, printed. Food Tech-

nology, The Garrard Press, 510 North Hickory, Champaign, Ill.

TRAWLERS:

"The Building of Large Fishing Trawlers," by E. M. Gorbenco, translation, *LLU Translation Bulletin*, vol. 2, no. 1, January 1960, pp. 25-41, illus., printed. (Translated from *Sudostroenie*, no. 5, 1959, pp. 33-37.) Lending Library Unit, Department of Scientific and Industrial Research, London, England.

TUNA:

"L'Organisation de la Campagne Thoniere 1959-60 a Dakar" (Planning the 1959-60 Tuna Fishing Season at Dakar), by Jehan Ichtsu, article, *La Pêche Maritime*, vol. 39, no. 984, March 1960, pp. 133-138, illus., printed in French, *La Pêche Maritime*, 190 Boulevard Haussmann, Paris, France.

UNITED KINGDOM:

Fishing, Choice of Careers, no. 90, 40 pp., illus., printed, 1s. 9d. (about 25 U. S. cents). Her Majesty's Stationery Office, York House, Kingsway, London WC2, England, May 1959. An informative booklet for young man trying to make a choice of careers. The hazards and loneliness as well as the rewards of a seafaring life are pointed out. Sections of the booklet are devoted to the apprenticeship, drifters and drifter-trawlers, seine fishing, other types of fishing, the crew of a trawler, training programs and courses offered at fishing ports, and further information and advice. Some excellent photos of activities on board fishing vessels are included.

Fishing in Distant Waters (Report on the British Fishing Industry Distant Water Trawlers) 1958, 48 pp., illus., printed. British Trawlers' Federation, Ltd., Grimsby, England. An unusually fine booklet describing, with the aid of a variety of photos and charts, the accomplishments and events of interest in the British distant-water trawling industry during 1958. Included are sections on a general survey of the industry; the fishery limits; the year in the ports of Fleetwood, Grimsby, and Hull; safety and rescue work of the trawlers; the business of fishing; and the full text of the Convention adopted at the First United Nations Conference on the Law of the Sea. The economic significance of the industry is stressed, as well as work done by the trawlers incidental to catching fish.

The Fishing Industry in Britain, 5 pp., No. R. 4288, printed. Reference Division, Central Office of Information, London, England, October 1959. A short survey of the fishing industry in Great Britain covering fishing ports, methods of sea fishing, the fleet, landings and imports of fishery products, fresh-water fisheries, and the distribution system. Also described briefly are promotion and regulation of the industry, the 1959 Northeast Atlantic Fisheries Conservation Convention, and whaling activities.

White Fish Authority Account, 1957-58, 3 pp., printed, 4d. (about 5 U. S. cents). Her Majesty's Stationery Office, York House, Kingsway,

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London WC2, England. Describes briefly legislation pertaining to grants for fishing vessels and engines for operations in the white fish groundfish industry. A chart shows receipts and disbursement of funds for such aid during the year ended March 31, 1958.

WHALE MEAT:

"Determination of the Time Required for Freezing Whalemeat," by K. Tanaka and J. Nishimoto, article, *Bulletin de L'Institut International du Froid*, 10th International Congress of Refrigeration, vol. 39, 1959, pp. 902, 904, printed in English and French. *Bulletin de L'Institut International du Froid*, 177, Boulevard Malesherbes, Paris 17, France.

WHALES:

The Scientific Reports of the Whales Research Institute, no. 14, 333 pp., illus., printed. The

Whales Research Institute, Tokyo, Japan, September 1959. Includes, among others, articles in English on: "Humpback Whales in Ryukyuan Waters," by M. Nishiwaki; "Food of Baleen Whales with Reference to Whale Movements," by T. Nemoto; and "Distribution of Amino Acid in Proteins from Various Parts of Whale Body," by T. Nakai.

WISCONSIN:

Wisconsin Conservation Bulletin, vol. 25, no. 1, January 1960, 37 pp., illus., printed. Wisconsin Conservation Department, State Office Bldg., Madison 1, Wis. Includes, among others, these articles: "Ice Fishing for Panfish," by Roland B. Stewart and Leonard J. Druschba; "What's New in Fish Management," by C. W. Threinen; "Some Views on the Whitefish Fishery," by George R. King; and "Wisconsin's Dangerous Mollusks," by Margaret C. Teskey.



EAT FISH FOR HEALTH

A recent book, Eat Well and Stay Well, by Dr. and Mrs. Ancel Keys, with a foreword by the distinguished heart specialist, Dr. Paul Dudley White, presents, in a layman's language, the latest medical discoveries about how diet affects heart, arteries, and blood cholesterol. This book also presents a number of recipes, each with calorie count and number of grams of protein and fat.

Of particular interest to the fish merchandiser is the chapter on fish and seafood, wherein the authors give "three major reasons why fish is of merit"--

- (1) "Fish contains only about half the calories of an equal weight of beef or pork--so you may 'eat hearty'."
- (2) "Fish provides excellent proteins at high concentration."
- (3) "Not only are fish generally low in fat, such fat as they contain does not raise the blood cholesterol level like meat and dairy fats."

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UNITED STATES CATCH BY AREAS, 1959

(Figures represent million pounds)

